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VOL. XVII. JULY, 1865. No. 2.

THE ORIGIN AND ANTIQUITY OF MAN: DARWIN, HUXLEY AND LYELL.

(1.) *The Origin of Species by means of Natural Selection*, by CHARLES DARWIN, M. A. New York: D. Appleton & Co. 1860.

(2.) *Evidence as to Man's Place in Nature*, by THOMAS H. HUXLEY. New York: D. Appleton & Co. 1863.

(3.) *The Geological Evidence of the Antiquity of Man, with remarks on Origin of Species by Variation*, by SIR CHARLES LYELL, F. R. S. Philadelphia: Geo. W. Childs. 1863.

THESE three works are very closely allied, not only by the doctrinal sympathies and intimate relations of their authors, but also by the close relationship of the subjects of which they treat, and the common object proposed.

Mr. Darwin attempts to show, that all animals now in existence have been derived from the lowest and simplest forms of life, by *transmutation* of species acting through illimitable periods of time.

Mr. Huxley adopts this doctrine of transmutation, and thinks that he has proved that Man is the nearly allied if not immediate descendant of the Gorilla.

Sir Charles Lyell accepts, with approbation, slightly modified, these views of his friends, and undertakes to furnish them, from the records of Geology, all the time demanded by their speculations.

We propose to briefly review each of the above works, with a view to determine how much of scientific truth and philosophy each is entitled to claim. Preparatory to this task, we desire to give expression to some thoughts in regard to the nature and distinction of Species,—as this is the main subject of the first two works we intend to review.

The question of Species—its origin, nature, and limits,—has always been a most vexed subject of dispute, upon which naturalists are now divided, and will probably always differ in their views. We may observe the facts connected with its phenomena, note its distinctions, and speculate on its nature, but the laws which govern its Origin and Extinction are beyond the reach of Philosophy. Its *causation*, if not revealed, must ever remain hidden in the mind of the Creator—for Science holds no clue to guide her groping steps. Where Science ends, Faith begins.

Prof. J. D. Dana, in an Article as profound as it is original, which appeared in the November No., for 1857, of the "American Journal of Science and Arts," has established, in a conclusive manner, the existence of species as "essentially realities in nature." Reasoning from the general to the special, he shews that the true *type idea*, or notion of species, is not to be found in any one group, but in the *potential element* which lies at the basis of the existence of each individual of the group. He demonstrates that, in accordance with the universal law which governs all existence, and which pervades all nature, this potential element must be a fixed and definite *unit*, capable of multiplication in the inorganic world, by combination of fixed equivalents, and in the organic world, by self-reproduction. Thus he proves that *permanency* is a necessary attribute of species, demanded by the harmony of the universal

law of existence; and he also shews that *variation* from the normal type—whatever that may be—is demanded by the universal law of "mutual sympathy," which determines all change of composition or decomposition, growth or decay. Hence he deduces, with great philosophical severity, the essential idea of a species, to be "a specific amount or condition of concentered force, defined in the act or law of creation."

This stringent formula is intended to embrace all the departments of nature; but while it expresses, with severe accuracy, the logical type idea of species, as a real existence, it by no means, as Prof. Dana admits, gives us a conception of the material *type* form. Though species is a reality, no type idea of it can be represented in any one material existence, nor be designated by any one example. Nor can we ascend, by induction, from a study of the individuals, to a correct conception of the type of the species,—inasmuch as "the variables," as well as "the constants," form an element of the type, and therefore the conception formed from the study of the individuals, is a conception only of its phases or modifications. Nevertheless, we may adopt this stringent formula as a safeguard against specious generalizations.

In applying it to the animal kingdom, we may construe it as meaning,—that specific degree and kind of vital organization necessary for the development of the individual under modifying circumstances, and which is defined by the act or law of its creation.

The above formula defines species in relation to its *essence*; but it is also desirable to consider it in relation to its manifestations of *form*, and to accompany the definition with some sure test, whereby to guide and correct our classification of individuals. Considered in this relation, we would define *Species to be an original organized form, specific in its kind and immutable in its fundamental characteristics, but capable of developing varieties under modifying circumstances. The individuals of a species constantly reproduce their like with those of the same species; but their offspring, by generation with any other species, is incapable of continuous fertility.*

This definition recognizes a special law of being for each in-

dividual of a species, stamping immutability upon its generic *seminal* characteristics, in harmony with the general law of Nature, which determines, with mathematical precision, the component elements of all bodies and forces. But while it thus imposes constancy of fundamental characteristics on all, it allows to each individual great *variety* of development in accommodation to surrounding circumstances, and in obedience to that universal law of mutual sympathy and reciprocal action, which diversifies with change every department of Nature.

Could we ascertain with accuracy the fundamental seminal characteristics which distinguish one animal from another, we would be able to make our scientific classification of species accord with that distinction which really exists in nature. Our present classifications are, in no small degree, uncertain and arbitrary, based, frequently, on very slight differences of structure, form or color. Thus, for instance, "a slight peculiarity in the coloring of a minute part of the anterior wing" of a butterfly, (Vanessa atalanta,) is sufficient to create a doubt whether it should not be made the basis of a distinct species. So also the African, Indian and fossil Elephant, (E. primigenius,) *are* made distinct species in consequence of slight discrepancies of form in the markings on the wearing surfaces of their molars ; which, in the first, are *lozenge* shaped, and in the last two, rather more rhomboidal.

Appealing to our present classifications, it is not strange that the advocates of the so-called development theory should find, in Nature, some few facts which apparently support their visionary hypothesis of transmutation of one species into another. These pretended instances of transmutation may be more correctly attributed to individual peculiarities, perpetuated under favorable circumstances, being simply *varieties* developed under certain conditions, and which present an apparent constancy, so long as the modifying conditions which developed them remain constant. Look at the vast changes that man has wrought by art in many domestic animals, developing varieties, but never altering species. See the striking differences which separate the races of dogs, many of which occur

naturally, and, under given circumstances, are constant. We class the brown and black bear as different species,—yet what differences do they present at all comparable to those which distinguish the mastiff from the spaniel, or the greyhound from the bull-dog ; or these again from the scent-hounds. So also the varieties of domestic fowls present as marked differences as those which distinguish many individuals of the parrot or grouse family, which are classified as distinct species.

Until the time of Lamarck, the scientific world generally accepted the definition of Linnæus, that "a species consisted of individuals, all resembling each other, and re-producing their like by generation." This definition, though vague, had the merit of fixing, by an infallible *test*, the line of distinction, but it did not recognize the law of change, by which *varieties* are developed from the influence of external causes. Lamarck, observing that some fossil "shells were so nearly allied to living species that it was difficult not to suspect that they had been connected by a common bond of descent," proposed to add to the above definition of Linnæus the following clause, viz : "so long as the surrounding conditions do not undergo changes sufficient to cause their habits, characters and forms, to change." This addition was very good, inasmuch as it recognized the universal law of change, by which varieties are developed in every department of Nature, within fixed limits. Had Linnæus inserted it in his definition, it would have constituted the basis of a true development theory, and would have precluded the origin of the present transmutation hypothesis.

Lamarck, ignoring Linnæus' great test of distinction, and not duly appreciating Nature's great law of change, fixed his attention exclusively on the *varieties* developed under this law; and by an unwarrantable generalization of facts, carefully observed, he broached the startling doctrine of progressive transmutation of species, by which the origin of Man, God's master-piece, has been derived from a monkey, through the successive evolutions of a primary monad. According to him, a short-legged bird, constantly desiring to catch fish to better advantage, gives rise to a race of long-legged waders.

In like manner, the camel-leopard has acquired its present shape, by constantly stretching out its neck to reach the higher branches of trees, as the lower ones became scarce. These fanciful lucubrations of Lamarck clearly indicate the origin of Mr. Darwin's hypothesis.

The anonymous author of the "Vestiges of Creation," which appeared in 1844, following closely in the tracks of Lamarck, introduced, as a principal element of change, the force of maternal volition, acting on the embryo, thereby transmuting it into a higher grade than its parent.

Mr. Darwin has somewhat modified these materialistic hypotheses, but it is doubtful whether he has much improved them. To get rid of the imputation, to which the others are liable, of making the orderly arrangement of nature the result of *blind chance*, he imagines the existence of some vague controlling power, called "Natural Selection," equally blind and materialistic, *operating solely through chance variations.* He also attempts to get rid of another objection to Lamarck's theory—which demands a continual creation of monads, by spontaneous generation, to supply the place of those which have been progressively advanced—by arguing that variation is not *necessarily* progressive, but that, in the struggle for existence, any animal, which has some slight advantage over his fellows, is "naturally selected" for transmutation into some other form, perhaps not superior in organization. This supposition, if true, involves no change of principle, but only a slight difference in the partial working of the machinery of development. The fundamental principle of both hypotheses is the same, viz :—that the Animal Creation has been progressively developed, from the lowest to the highest form, from a Monad to Man.

Mr. Darwin's scheme of creation is based entirely upon the following assumptions :—

1st. That "all the organic beings, extinct and recent, which have ever lived on this earth," are the modified descendants, by natural generation, of one common ancestor, and in this common descent, "all have been connected by the finest gradations." His argument for this assumption is an unwarrant-

able application of the maxim so often quoted by him, "Natura non facit saltum."

2d. As all animals are apt to *vary*, and have a tendency to increase beyond the means of subsistence, he assumes that some advantageous chance variation in an individual, transmitted to its posterity, has enabled them to root out their fellows, in the struggle for food, and has led, "as a consequence, to Natural Selection," thus giving birth to new species, and causing "the extinction of less improved forms." His argument for this assumption is based on a perverse generalization of the well-known fact, that all animals are capable of developing *varieties*,—and he supports it mainly by citing the great diversity of form produced in pigeons, and other animals, by a careful and judicious selection.

3d. His greatest assumption—and a monstrous one it is—consists in making this "Natural Selection," which is the consequence of physical causes, the law-giving *cause* and controlling agent of creation, endowed with an all-wise and all-provident intelligence. He asserts that this "Power" has accumulated the slight accidental variations of individuals, from the beginning of time, preserving the good and rejecting the bad; that it has, with consummate wisdom, directed these chance variations into many distinct lines of development, thereby *creating* new animals with new organs; that it has adapted them to their proper localities and proper functions; endowed them with their necessary instincts; and distributed them into those distinct classes, orders, genera and species, which we now behold. The monstrous assumption that such an imaginary power exists in nature, being, at the same time, both the creature and the creator of physical law, is the pivot on which Mr. Darwin makes his hypothesis revolve, in order to meet any objection or to solve any difficulty.

On these three assumptions, Mr. Darwin founds what he calls his "theory," and against it we advance three objections.

1st. His "Natural Selection," considered as an intelligent Agent, is not a *vera causa*.

2d. His natural selection, considered as the consequence of physical law, is *incompetent* to produce the changes which he attributes to it.

discriminating "Power," which accomplishes all the changes, and explains all the mysteries of Creation. We will proceed to give some quotations, to prove how distinctly our author invests this power with the attributes of a controlling, intelligent Creator, constantly at work.

"It may be said that natural selection is daily and hourly *scrutinizing*, throughout the world, every variation, even the slightest; rejecting that which is bad, preserving and adding up all that is good." —p. 80.

"If then we have, under nature, variability, and a powerful agent, *always ready to act and select*, why should we doubt that variations in any way useful to beings under their excessively complex relations of life, would be preserved, accumulated, and inherited?——What limit can we put to this power, acting during long ages, and *rigidly scrutinizing* the whole constitution, structure, and habits of each creature, favoring the good and rejecting the bad? I can see no limit to this power," &c.—p. 407.

"If it profit a plant to have its seeds more and more widely disseminated by the wind, I can see no greater difficulty in this being effected through *natural selection*, than in the *cotton planter* increasing and improving by selection the down in the pods on his cotton trees."—p. 82.

"Natural Selection *acts*, as we have seen, exclusively by the preservation and accumulation of variations which are *beneficial*," &c.—p. 117.

"If it were no advantage (to an earth worm to be highly organized) these forms *would be left* by natural selection unimproved, or but little improved; and might remain for indefinite ages in their little advanced condition."—p. 119.

"If, under changed conditions of life, a structure before useful becomes less useful, any diminution, however slight, will be *seized on* by natural selection; for it will profit the individual not to have its nutriment wasted in building up an useless structure."—p. 134.

"And as long as the same part has to perform diversified work, we can see why it should remain variable; that is, why natural selection should have *preserved* or *rejected* each little deviation of form less *carefully*, than when the part has to serve for one special purpose alone."—p. 135.

These few quotations aptly illustrate the sophistical as well as illogical reasoning which our author employs throughout his book. He first assumes the existence of a purely imaginary cause, to which he arbitrarily ascribes, as occasion requires, the attributes of omniscience and omnipotence, and *then* he "can see no great difficulty" in imputing to its sole agency all the diverse phenomena of Nature. This sophistry the more grievously offends, by being constantly palmed off on us as a logical

argument, in proof of his visionary and oft-times absurd speculations.

But we have selected these passages to prove that the author clearly asserts Natural Selection to be, not only an all-powerful, intelligent, and discriminating Agent, but that its power and intelligence is exerted exclusively for the benefit of the individual. In fact, our author says, plainly :—

"Natural Selection will never produce in a being anything injurious to itself, for Natural Selection acts solely by and for the good of each."—p. 179.

Yet, on the same page he says,—"But Natural Selection can and does often produce structures for the direct injury of other species." This last remark is made to explain the existence of poison fangs in the adder and the rattlesnake. But here our author finds himself in a hobble. The sting of the wasp and bee, owing to the backward serratures, cannot be withdrawn, and therefore cannot be used by the insect without causing its inevitable death. He attempts to obviate this objection, by the remark, that "Natural Selection will not produce absolute perfection." But still, aware that the above fact gives the lie to his oft-repeated fundamental principle,—that Natural Selection never produces an organ for the injury of its possessor,—he tries to reconcile it by concluding that this sacrifice of the individual is made *pro bono publico!* "For," he says, "if, on the whole, the power of stinging be useful to the community, it will fulfil all the requirements of Natural Selection, though it may cause the death of some few members." This easy requirement, however, does not comport with what he says on the next page, in regard to the "inexorable principle of Natural Selection."

We now proceed to give a crowning instance of this imaginative author's fanciful scheme of creation, by the agency of Natural Selection.

On page 169, he says :—

"If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down."

But he can find no such case,—and therefore gives us his

recipe for making an "eye," which we commend to the reader's special attention. It is as follows :—

"It is scarcely possible to avoid comparing the eye to a telescope.—
—If we must compare the eye to an optical instrument, we ought, in imagination, to take a thick layer of transparent tissue, with a nerve sensitive to light beneath, and then suppose every part of this layer to be continually changing in density, so as to separate into layers of different densities and thicknesses, placed at different distances from each other, and with the surfaces of each layer slowly changing in form. Further, we must suppose that there is *a power always intently watching* each slight accidental alteration in the transparent layers; and *carefully selecting* each alteration which, under varied circumstances, may in any way, or in any degree, tend to produce a distincter image. We must suppose each new state of the instrument to be multiplied by the million; and each to be preserved till a better be produced, and *then the old ones to be destroyed.* In living bodies, *variation* will cause the slight alterations; *generation* will multiply them almost infinitely, and *natural selection will pick out with unerring skill* each improvement."

He remarks, in this connection, on page 168 :—

"I can see no very great difficulty, (not more than in the case of other structures) in believing that Natural Selection has converted the simple apparatus of an optic nerve, coated with pigment and invested by transparent membrane, into an optical instrument, as perfect as is possessed by any member of the great Articulate class."

In the next sentence he says :—

"He who will go thus far, ought not to hesitate to go further, and to admit, that a structure even as perfect as the eye of an eagle might be formed by Natural Selection, although in this case he does not know any of the transitional grades."

And then adds, with sublime coolness :—"His reason ought to conquer his imagination." !

Upon the strength of *such reasoning*, he requires the reader to admit that "there is no logical impossibility in the acquirement of any conceivable degree of perfection, through Natural Selection."

Every reader of Mr. Darwin's book must be struck with one peculiarity, which characterizes his mode of argumentation, or manner of handling his subject,—for it can hardly be called reasoning, even by courtesy. It consists in the use of the term, "Natural Selection," in connection with such expressions as, "I can see no difficulty,"—"It is conceivable,"—"We may

suppose," or "I have no doubt,"—occurring on almost every page, and constantly advanced in explanation of all the mysteries of nature, without the slightest regard to logical sequence.

Thus the difficulties of a question are stated and re-stated with many facts, opinions, and much irrelevant matter, and then the most astounding conclusion is drawn from a very frivolous premiss, or the most sweeping generalization is based on a flimsy foundation, which, coupled with the above stereotyped expression, is offered as a full and logical solution of the whole difficulty. We will give but two instances, out of a host.

The constant re-production, in every community of bees and ants, of working *neuters*, presenting a fixed structure different from their parents, is a mystery which is fatal to his hypothesis; for this peremptorily demands that the acquisition and perpetuation of any given form, shall be the effect of direct inheritance. His hypothesis, therefore, will not apply to those forms the possessors of which are sterile. "But," says Mr. Darwin, "some insects, in a state of nature, *occasionally* become sterile;" this is his premiss,—and the conclusion which he immediately draws from it is this:—

"And if such insects had been social, and (if) it had been profitable to the community that a number should have been annually born, capable of work, but incapable of procreation, *I can see no very great difficulty in this being effected by Natural Selection.*"—p. 209.

Nor can any one else, *if* "Natural Selection" have the same power as God Almighty.

Again,—he learns from Mr. Hearne, that a black bear was seen swimming, for hours, with widely open mouth,—probably overheated by running, and cooling himself. His assumption is, that he was "thus catching, like a whale, insects in the water." His generalization of this odd freak of a bear, and its *supposed* motive, is, that black bears may become the progenitors of a whale-like progeny. He says:—

"Even in so extreme a case as this, if the supply of insects were constant, and if better adapted competitors did not already exist in the country, *I can see no difficulty in a race of bears being rendered, by Natural Selection,* more and more aquatic in their structure and

habits, with larger and larger mouths, till a creature was produced *as monstrous as a whale.*"—p. 165.

Mr. Darwin's own inability to see any difficulty in nature which his Natural Selection cannot remove, is always his strongest argument to induce others to accept his hypothesis.

The examples, as well as the reasoning, by which he seeks to inculcate his doctrine, in the way of illustration, insinuation, or indirect support, are extremely lame and impotent, not to say frivolous. Thus, for instance, from the fact that a woodpecker has been occasionally seen feeding on fruit, or catching insects in the air or on the ground, he would have us to conclude that this bird was not originally formed to climb trees and bore for insects, but that this faculty was conferred on it by Natural Selection. In proof, he tells us that he had once seen a bird which he *considered to be a wood-pecker,* [mark the evidence,] inasmuch as it looked and flew very much like a wood-pecker, but "which never climbs a tree," [mark the proof,] for he met with it "on the plains of La Plata, where not a tree grows."—p. 165. Thus he cites the frigate-bird, as being web-footed, yet never alighting on the water, [a mistake,] and also the grebe and coot, which are eminently aquatic, "although their toes are only bordered by membrane,"—as proof that these birds are being transmuted, by Natural Selection, into different species. He says, "In the frigate-bird, the *deeply* scooped membrane between the toes *shows* that the structure has begun to change." In like manner, he would have us come to the same logical conclusion of transmutation by Natural Selection, *because* "there are upland geese, with webbed feet, which rarely or never go near the water,"—and because, petrels, the most aërial of birds, and water-ouzels, which belong to the thrush family, dive and swim, (as he asserts,) like auks or grebes.

So also the existence of rudimentary front teeth in calves is advanced as convincing proof that some ancient cow, who had lost her front teeth, or who had laid them aside by "disuse," finding that she could get along better with tongue and palate, was the progenitrix of all cattle which have no upper front teeth. In like manner, from the rudimentary teeth

of fœtal whales, he insinuates their *terrestrial* origin—probably from *bears*, as before stated. So also, as the tail is an organ of motion in fishes, he argues that Natural Selection has modified the shape, but preserved the same use in terrestrial animals of *aquatic* origin; thus in dogs, (he says,) the tail enables them to turn quicker, though he admits that the hare, with hardly any tail, turns readily enough.

Mr. Darwin's book is not a work of scientifically applied facts in proof of a theory, but is, principally, a diffuse and very illogical argument, based on a misapplication of known facts, by which he seeks, first, to support his gratuitous assumptions, and then, by a fanciful not to say absurd application of his assumptions to more obscure facts, he attempts, at the same time, to establish his hypothesis, and also to claim for it the merit of explaining these obscurities.

Giving free scope to a lively imagination, inherited, doubtless, from his grand-father, the celebrated author of the "Loves of the Plants," Mr. Darwin has generalized from his assumptions, and has thus devised an hypothesis, which makes men and brutes all but self-existent, since they are self-created from simple monads, upwards.

Thoroughly, and we doubt not, honestly convinced of its truth, he asserts its competency to explain all the mysteries of creation more satisfactorily than any other theory, and he can see no difficulty, under its illumination, in accounting for the most obscure phenomena of nature. It is, however, in regard to the origin and extinction of those ancient forms of life which Geology discloses, that Mr. Darwin claims for his hypothesis special merit. He thinks he has at length solved this difficult problem. Let us carefully test this claim.

Geology teaches, with great distinctness, the successive changes which have modified the surface of the earth—from that state in which no trace of organization can be discovered, up to its present condition, teeming with varied forms of life. It also records the successive appearance of different forms of organized beings, advancing in the scale of creation, from the simplest cellular plants and plant-like animals, entombed in the deepest rocks of the earth, to man, whose origin cannot be

traced beyond the dust and "drift" which cover its present surface. It also reveals the fact that each race, as it came into existence, was admirably adapted to the physical condition of the earth at the time of its appearance, to the place it was designed to fill, and the functions it was called upon to discharge.

This is the catholic creed of Geologists, whether they believe in Revelation or not. Preparation, plan, and nice adaptation, mark every stage of the world's progress. "Nor is it only the PLAN of the great types, (to use the words of Agassiz,) which must have been adopted from the beginning, but also the *manner* in which these plans were to be executed; the systems of form under which these structures were to be clothed, and even the ultimate details of structure which, in different genera, bear definite relations to those of other genera; the mode of differentiation of species, and the nature of their relations to the surrounding media, must likewise have been determined,—for the character of the classes is as well defined as that of the four great branches of the animal kingdom, or that of the families, the genera, and the species." He also expresses the conviction, "*that the whole creation is the expression of a thought, and not the product of physical agents.*"

The four great types referred to above, present characteristic structural differences, which were as fixed and determinate in the earliest animals which Geology reveals, as they are in those of the present day.

By adding to these great types the lowest form of animal life, we have five great divisions of the Animal Kingdom, under which every animal that has ever lived may be ranked, and which may be specified, beginning at the lowest, as, I. Protozoans; II. Radiates; III. Molluscs; IV. Articulates, and V. Vertebrates.

How many and which genera or species, comprised in each of these great divisions, were original and independent creations, what developments or modifications from external causes these primordial genera or species have undergone, will probably, as we have before said, always be a matter of doubt and dispute.

While Geology discloses in each of these great divisions gradational forms adapted to their surroundings, it also discloses the co-existence of three of these distinct types, in the earliest periods of time, and consequently forbids the idea of their progressive transmutation from one to the other. It establishes the fact of separate and independent creations, each with its distinct gradational forms,—and thus concurs with Divine Revelation, as well as with scientific observation and human experience, in condemning the visionary speculations of Mr. Darwin.

In what way these distinct primordial forms first came into existence, science is absolutely incompetent to determine, for the line of inquiry is beyond her reach. If the great Author of nature has given us no revelation of His creative acts, which faith can receive, we must necessarily be content to remain in humble ignorance.

Mr. Darwin, however, is of an entirely different opinion. He thinks he can explain how physical laws and physical agents have brought into existence all the successive forms of organic life, from its first beginning, and how they have, with discriminating wisdom, adapted them to the progressive modifications of the earth's surface, determined their mutual relations, as parts of a whole system, and decreed the functions which each was to perform in the drama of life.

He is, indeed, forced to admit the necessity of some supernatural agency, (he does not say what it was,) in order to account for the vitality of at least "*one primordial form into which life was first breathed.*" This being done, all necessity ceases for further intervention on the part of the implied Deity, and the whole *plan* of creation, as subsequently realized, so wise, so beautiful, so wondrously harmonious, is the result of the chance operations of physical agents, under the watchful and beneficent providence of Natural Selection!

In order to test the scientific and philosophic merit of this hypothesis, let us make a rigid application of it to the known facts of the Animal Kingdom.

As the fundamental idea of this hypothesis is the transmutation of animals from simpler to higher forms, by Nat-

ural Selection, "accumulating slight successive favorable variations," it is evident that the primordial forms of Mr. Darwin must have belonged to the lowest great division of the Animal Kingdom, viz., to the Protozoans.

Thanks to the labors of Prof. Ehrenberg, of Berlin, and others, this sub-kingdom, hitherto little known, has been very thoroughly explored. In one class, (infusoria,) which Ehrenberg has named Polygastria, he has described twenty-two families, of which the Monadida is the first and simplest, each containing many species. This class "exists, in countless millions, in water, both salt and fresh;"—"many of these living atoms crowd the water in which they are found to such an extent, that they are not separated from each other by a space greater than the size of their whole bodies; so that, by a very little calculation, it will be seen that one drop of such water contains more of these active existences than there are human beings on the surface of the globe." Their universal distribution, where water is to be met with fit for their reception, is another marvelous fact connected with these animals.

Mr. Darwin could not desire better conditions for the test of his hypothesis. Here we have all his so-called *laws*, in vigorous operation; "Growth, with Re-production;" "Variability;" and especially his main law, "a Ratio of Increase so high as to lead to a Struggle for Life, and, as a consequence, to Natural Selection, entailing Divergence of character, and the Extinction of less improved forms." We are ready to admit, that in this state of things, at an early day, some one or more monads, pressed by hunger, may by *chance* have developed "a Variation;" possibly, some superiority in their prehensible proboscis, which is their only external organ, and serves for progression and nutrition. We agree that this would give them a very great advantage over their fellows, and that they would "have a better *chance* of surviving, and thus be *naturally selected*" to become—better fed monads.

This variation of form, thus acquired, would doubtless be transmitted to their offspring, without the aid of our author's inevitable Natural Selection,—for these animals have no sexual preferences, but perpetuate themselves by self-division.

Nor is there here any chance for "Natural Selection (to act) by accumulating slight successive favorable variations;" for, granting at the start, the greatest possible variation which the simple structure of these animals will admit of, consisting of a stomach and proboscis, the only result that could follow would be, a race of better fed and better developed Monads. The utmost development of any *variation* in the form of these organs, would not *transmute* them into new and different organs; and we have demonstration that it has worked no "Divergence" in the essential characteristics, nor produced any "Extinction" of this simplest aboriginal family.

So also one or more of the voracious family of the Amœba, who are ever changing their shapes by the protrusion and retraction of the foot-like processes of their bodies, might, by some accidental variation or increase of this faculty, have been able to feed more abundantly on other animalculæ. Such variations, transmitted to their descendants, may have produced that diversity in size and shape which we now observe; nevertheless, the characteristics of the family remain unaltered.

These are instances of the lowest forms of animal life,—mere animated globules, or living ventricular sacs, corresponding to the cellular amphigams of the Vegetable Kingdom. According to the hypothesis of Mr. Darwin, they, or their vegetable analogues, must have furnished the "one primordial form," from which, he thinks, "all the organic beings which have ever lived on this earth, have descended,"—for, there are none lower, to be developed into higher forms of life, by *Natural Selection.* What "Divergence of character and extinction of less favored forms" has Natural Selection accomplished, during the millions of ages which are claimed for organic life? These first progenitors of animated nature, according to a strictly consistent interpretation of this hypothesis, ought to have gone to their graves long ago,—having been pushed out of existence in the struggle of life, by far higher and more favored forms,—for it is upon this principle that Mr. Darwin accounts for the extinction of those ancient races which Geology reveals. But the fact is, these *forefathers* still live and flourish; they have undergone no extinction or divergence of

character, for they remain, still, the lowest and simplest possible form of organization, and their prodigious numbers are still as great as they possibly could have been, when a primal sea deposited in the Cambrian strata the first token of organic life.

Such is the starting point to which Mr. Darwin has confined himself, by his own terms ; and according to his direct statements, this is the beginning and end of the Divine agency in the work of creation. He tells us, plainly, that every other animal has been manufactured, by Natural Selection, out of the *inherited chance variations* of probably one primordial form,—the bad ones being rejected, and the good ones accumulated and "worked up" into different types of organization, by this ever-vigilant power. According to him, God created only a *monad*, but Natural Selection has transmuted it into a reasoning *man*, and has breathed into him a conscious immortal soul !

Such is the monstrous and absurd conclusion in which his hypothesis ends. In support of it, he appeals in vain to Geology, to prove that the extinct forms of ancient life, were the gradual developments of one parent stock. Geology refuses to reveal that infinite succession of slightly differing gradational forms which his hypothesis demands,—but, on the contrary, denies the assumption, by disclosing Protozoans, Radiates, Molluscs, and Articulates,—all co-existent from the earliest time. Mr. Darwin is conscious of this, and, accordingly, *laments* the imperfection of the geological record, but *hopes* that the time will come when it will be more in accordance with his hypothesis. He would have had less cause for grief, if he had framed his hypothesis in accordance with facts, instead of seeking, by gratuitous assumptions, to explain facts, to which he afterwards appeals in vain to prove his hypothesis.

He invokes the aid of time to prove, that these assumed transmutations of structural type, of which no trace can be found in the lowest of the zoic rocks in which fossils occur, were produced imperceptibly, by infinitely small degrees, during the illimitable periods of geological eras, which he claims for the azoic rocks, in which no trace of life has ever been discovered. But time, without specific force, (which he has failed

to demonstrate,) is powerless to effect change. An eternity of time could never quicken into motion the vis inertiæ of unorganized matter, so as to create new organizations,—nor could it change, in the slightest degree, the laws imposed on organized beings, from their first origin.

In framing his fanciful scheme, had he taken for his starting point, the original creation of one or more primordial forms in each of the great and distinct divisions of the Animal Kingdom, from which to develop his variations, he would have met with far less opposition from the geological record.

He might then have argued with far more plausibility from the development of variations, and from the modification of external causes, that the ancient extinct forms of each division had been gradually supplanted by kindred representatives now living. Passing over, in silence, the four lower sub-kingdoms, and confining himself solely to the highest, or Vertebrate, he would have found full necessity for the most extensive periods of time, and full scope for the most unbridled imagination, in applying these causes, simply, to the gradual development of homologous parts, so as to account, by the accumulation of slight beneficial changes, for the transmutation of the gills, scales and fins of a fish, into the lungs, feathers and wings of a bird, equipped with beak and claws.

We say that such a supposition would have been more plausible, though it would still be irreconcilable with geological facts and sound philosophy. But the admission that several or all the great types of organization were distinct creations, would entirely defeat the scope and aim of our author's hypothesis, which is, manifestly, framed so as to make the nearest approach to spontaneous generation, and to exclude a Divine Creator, as far as it is possible, from the works of creation.

Having breathed life into a globular monad, there is no farther need for His creative agency, or orderly arrangement. Mr. Darwin's imagination can "dream the rest;" thenceforth Natural Selection takes the place of Divine intelligence.

We think it is evident, that Mr. Darwin has sought, from the very start, to invent an hypothesis which should be in direct opposition to what he calls "the common theory of sep-

arate and independent creations,"—meaning thereby the Mosaic theory. He is constantly challenging this theory, as incompetent to explain those mysteries of life which he thinks are so clearly elucidated by his own fanciful speculations. Aristotle attributes distinct creations to the "mens divina,"—Plato, to the "anima mundi,"—and Harvey, a wiser physicist than either, to "the Creator and Father of all things in heaven and earth;" but Mr. Darwin charges with folly or wilful blindness, all who cannot see that Natural Selection exercises all the attributes of a Divine Creator. Notwithstanding this arrogant assumption of superior wisdom, had he fairly and scientifically generalized from the facts which he has confusedly heaped into a visionary hypothesis, he would have more rationally deduced the theory, that all animals were originally divided into fixed classes, according to great structural types, as Science attests. He would have recognized, that in each of these divisions, life had been breathed into a certain number of primordial forms,—we know not how many,—and that each of these primordial forms, whose "seed was in itself," was endowed with an inherent capability of variation,—to what extent we know not,—but such as would enable the race to conform to surrounding conditions, and to the progressive changes of the earth's surface.

Such a theory would be in accordance with Natural Science, and it would also be in accordance with the Mosaic record of creation, which claims to be a direct Revelation from its Divine Author. Such a claim, however, would not be admitted by the author of the "Origin of Species by Natural Selection." It would require too much *Faith* on the part of a scientific physicist, who studiously avoids all recognition of the agency of a Divine Creator, but who, nevertheless, with singular inconsistency, invests physical agents with the attributes of a provident Divinity.

To show how much faith our author demands from us,—his own cosmical Genesis, if thrown into an equally compendious form as that of Moses, would necessarily be as follows, according to his own statements. "In the beginning there was, probably, 'some one primordial form, into which life was first

breathed,' for all 'animals have descended from at most only four or five progenitors, and plants from an equal or less number.' These progenitors, who were simple vegetable cells, or animal monads, have produced, by natural generation, each after his kind, whose seed is in itself, all the grass, herbs and trees on the face of the earth; also, all the creatures that move in the waters, or which fly in the air; also all the creeping things, beast and cattle of the field; also all the men that inhabit the earth. All these were generated by, 'probably,' only one monad, who developed 'variations' according to a law styled '*Variability*,' and transmitted them to successive generations of lineal descendants, in virtue of a law styled '*Inheritance*,' which is implied by the law of '*Growth, with Reproduction.*'—Thus were created all the diverse complicated structures of the Radiates, Molluscs, Articulates, and Vertebrates, which now inhabit earth, air and water.—Moreover, as each new animal came, successively, into existence by '*chance*' variations, his appropriate place was allotted him, his proper functions assigned, and his due and orderly relations to other animals prescribed by '*Natural Selection*,' which is a consequence of the 'frequently recurring struggle for existence' arising from the fact of 'many more individuals being born than can possibly survive.'"

We assert that the above is a truthful expression of Mr. Darwin's hypothesis, given, as nearly as possible, in his own language, but divested of its verbiage and sophistry. The bare statement of its requirements shows, that it is equally opposed to analogy, scientific observation, human experience, and common sense.

He demands from Naturalists FAITH to believe in opposition to Science and sound Philosophy, that the four great types according to which all animals above Protozoans have constantly and uniformly been constructed, from the dawn of creation, are simply inherited variations in the forms of primordial monads. He requires them to believe that the orderly arrangement, by which all animals according to each distinct type, have been distributed into distinct natural classes of genera and species, manifesting the affinities of their peculiar types in an endless

variety of structural resemblances, yet always separated by fixed genetic differences, and that the skillful contrivance by which each of these distinct types has been modified in the construction of each species of animals, fitting them to inhabit land, water and air,—are accidental results. Also, that the consummate wisdom, manifested in the co-adaptation and the co-relation of their diverse functions, establishing the mutual interdependency of all, in connection with individual antagonisms, thus binding all into one harmonious system, evincing the forethought of a plan, is fortuitous. We are modestly asked to believe, that all this order, contrivance and wisdom, is merely the result of slight chance variations of the lowest form of Protozoans, accumulated and systematically arranged by some incomprehensible and undefinable *thing*—a sort of physico-divinity—a chimera of Mr. Darwin's imagination, which has no place either in Science or Nature—dubbed "Natural Selection."

There is not a single fact to support his foundation principle of transmutation by Natural Selection, nor a particle of evidence to countenance a belief in the intelligent agency, or even in the possible existence of such a Power; and therefore the whole gigantic superstructure, built on this *phantasm*, stands, like an inverted pyramid, based on an ideal *non-entity*.

Surely, Mr. Darwin counts too much upon our credulity, as well as upon our ignorance of the secrets of Nature, when he asks us to accept such an hypothesis, as a substitute for the common theory of separate and independent creations,—or else he has sadly blundered in the use of his terms. The effects which he attributes to "variation" are distinct *creations*—and the agency of an intelligent, Divine Creator, is mystified under the name of "Natural Selection."

The reader will doubtless desire to know upon what facts so astounding an hypothesis is based. We answer, mainly upon some observations of pigeons, made by the author, who is at pains to inform us that he has "associated with several eminent fanciers, and have [has] been permitted to join two London Pigeon Clubs." These observations, and certain facts obtained from gardeners, cattle-breeders, and others, in regard to the great and beneficial changes effected by a *judicious selec-*

tion of parents for cross-breeding, thereby originating new *varieties* of the same species, and the facts derived from some naturalists in regard to the blending of species and varieties in our classifications—constitute the only ground for his doctrine of the origin of species by Natural Selection. Numerous other facts cited by our author, sometimes to support his assumptions, and sometimes to be fancifully explained by them, are all susceptible of a much more philosophical application than he makes of them, and are not properly relevant to his hypothesis.

The fact that all his numerous breeds of pigeons, manifesting every variety of form and color, were well ascertained descendants of the blue rock pigeon, gives good ground for the belief, that many plants and animals, presenting less marked physical differences, though *classed* as distinct species, are also descendants from a common parent. This furnishes a strong argument against the endless multiplication of species, with which our present systems of classification are burthened,—but it is no evidence in favor of transmutation.

So also his facts and reasoning in regard to the numerous races of dogs; the stripes and bars on horses; hybridity of plants and animals; the change of form and habits produced under domestication, by skillful selection, or occurring naturally; the modification of some races and the extinction of others;—and much other matter which he misapplies, might be aptly cited to show that our knowledge of the conditions essential to the *perpetuation* of varieties, and of the *limits* to which their development may be carried, is still very imperfect. These facts would go far to prove that many reputed *species*, living and extinct, are simply *varieties* of one or more primordial species, but they furnish no proof whatever, that the duration and successive phases of development, of each primordial form were not pre-determined and immutably fixed by the law of its creation.

The analogies drawn from embryology and homology, in support of transmutation, are utterly fallacious. The affinities of structure and development, are no proofs of successive derivation; they only illustrate the infinite contrivance of the Crea-

tor, Who, from a few elements, has constructed an endless variety of forms and functions. A mechanic, in building a boat, a carriage, a balloon, or a house, may and does use the same materials, and constructs each upon the same principles of art, and he may, if he choose, give to them all a similarity of external form; yet each of these structures is a distinct creation, designed for a different element, and a different purpose, which cannot be transmuted by any kind of selection, without doing violence to the design of the builder.

Mr. Darwin devotes a considerable portion of his book to a labored and able attempt to prove, by facts and reasoning, that each species has migrated from a common center or "area," and has thus been distributed over the face of the globe. The establishment of this fact is necessary for those who maintain the common theory of the separate and independent creation of man and animals, which Mr. Darwin is combating. But we confess that we cannot see how it is relevant to an hypothesis which can consistently claim any necessary multiplication of centres or areas. In fact, this claim is an essential feature of his scheme. Why should not his ever vigilant Natural Selection act as efficiently in one part of the world as another? The waters that wash the shores of every island, would furnish an abundance of "primordial forms," out of which Natural Selection could manufacture those species which were the best adapted for the locality, without the necessity of their emigrating from a distant area. Saving of time can be no object, for Mr. Darwin can justly claim that his friend Lyell has furnished him with illimitable periods of duration, for the most recent formation of the earth.

In conclusion, we would remark, that the philosophical aspect of Mr. Darwin's hypothesis, is as objectionable as the scientific. A fallacious kind of argumentation characterizes all his reasoning. He confounds varieties with genetic differences of species, and then, by a false analogy, drawn from the great changes in animals of the *same* species, resulting from a skillful selection, made by the human reason, he accounts for *difference* in species, by referring it to a natural selection, dependent on appetite and other causes, external and accidental. Man,

guided by reason,—a gift which allies him to his Creator,—can *sub-create*, so to speak, and modify, within certain limits, the form and qualities of a dog, an ox, or a pigeon, by a judicious selection of parents, but he cannot make the slightest approach towards transmuting one of these animals into the other,—as is conclusively proved by the sterility of hybrids. They present specific genetic differences, imposed by the Author of creation, which man cannot alter or disturb. Is it not, then, the height of philosophic absurdity to appeal to this selection of the human reason, in proof of the assumption, that an unintelligent natural selection, operating through a blind "chance," can transmute a bear into a whale, even though our author can see no great difficulty, as he says, in such an operation?

Another radical vice in Mr. Darwin's philosophy consists in confounding, or rather confusing, the gradual, constant, and steady progress of life, from the simplest to the highest forms, in each of its *fixed* great typical divisions,—a gradational progress taught with equal clearness by Geology and Revelation,—with *transmutational* advances from one type to another, by "intermediate gradational forms," of which there is not a particle of evidence, either in existing nature, or in the records of Geology.

But the ineradicable fallacy which vitiates his whole scheme, and converts it into an incredible philosophical romance, consists in making the order, harmony and unity of design, which is so plainly stamped on the plan of creation, to depend on some blind, accidental concatenation of physical causes, occurring in the struggle for life among animals, and resulting in the consequent production of an *intelligent* and *beneficent* power, which *creates* all the forms of life, scrutinizes and controls all the phenomena of nature, and upon which the discoverer has conferred the name of "Natural Selection." It would be just as philosophical, and also just as intelligible, to say, that the Natural Selection consequent upon the motion of individual comets, has determined the orbits and relations of the heavenly bodies, as to assert, with Mr. Darwin, that the Natural Selection consequent upon the struggle for existence among individual animals, has exercised all the attributes of a provident Deity, in regulating the order of the Animal Kingdom.

We think we have said enough to shew the utter worthlessness of this transmutation doctrine, in a scientific and philosophical point of view. We have refrained from saying anything of its bearing on Revelation. We do not think it wise to attack with the sword of God's Word the honest infidelity of scientific men, who may be earnestly seeking to advance what they consider scientific truth, however much it may militate against our own views of Revelation,—provided always that no intended issue is sought by them.

Secure in the panoply furnished by the Holy Scriptures, we hold ourselves ever ready to give a reason for our faith in them, and to defend them from all attacks. We ask no odds against honest scientific infidelity, but are willing to meet it fairly on its own ground, confident, that although truth may sometimes appear to disagree with itself, yet it can never contradict or destroy itself,—and that it must ultimately triumph over error. We have no fears for the safety of the Bible. It is, saith Sir Thomas Browne, "too hard for the teeth of time; it cannot perish but in the general flames, when all things shall confess their ashes."

The internal evidence of its Divine origin is set forth by Dryden, in an unanswerable argument.

> "Whence but from Heaven could men unskilled in arts,
> In several ages born, in several parts
> Weave such agreeing truths? or how or why
> Should all conspire to cheat us with a lie?
> Unasked their pains, ungrateful their advice,
> Starving, their gain, and martyrdom their price."

Nevertheless, we know that the faith of some unstable souls and weak minds, has been shaken by the incredible assumptions of this visionary hypothesis. Mr. Darwin seems to be aware of this fact, and meets the objection with his usual stereotyped argument of *inability to see it.* He says, in his Supplement, "I see no good reason why the views given in this volume should shock the religious feelings of any one;" and then adds, with great self-complacency, "It is satisfactory, as showing how transient such impressions are, to remember that the greatest discovery ever made, namely, the law of gravity,

was attacked by Leibnitz, 'as subversive of natural, and, inferentially, of revealed religion.' "

It is charitable to suppose, that "an overweening confidence in the principle of Natural Selection," which Mr. Darwin admits he is chargeable with, has so obfuscated his mental vision, that he cannot see the inconsistencies and true drift of his own hypothesis. He cannot see why it should shock the religious feelings of any one! The reason is very obvious to others, if not to him. If this hypothesis be true, then is the Bible "*an unbearable fiction*," fabricated during successive ages, under an incomprehensible system of preconcerted imposture, yet interwoven with, and supported by, the history of many nations; attested by stupendous frauds, which, nevertheless, defy the severest scrutiny; promulgated with perfect consistency by many generations of disinterested impostors, who manifest, in their lives and writings, the sublimest morality. If this hypothesis be true, then also have Christians, for nearly two thousand years, been duped by a monstrous lie,—which, nevertheless, has consoled them in every exigency of life, and supported them in the hour of death; and which has, by its own intrinsic power, elevated and civilized all mankind.

The issue is a very plain one. The Bible is a self-agreeing system of pretended truth, which deals with every man as a distinct, immortal, spiritual being; while the hypothesis of Mr. Darwin, in shocking opposition, denies or ignores the very existence of the human soul, on which this system is founded.

This feature of it furnishes us with our last and strongest argument against his absurd scheme of creation. We will not, however, attack him with any weapon drawn from the arsenal of God's Word, but will meet him upon his own ground.

We premise,—and this must be well noted,—that Mr. Darwin is restricted, by his own terms, to the simplest form of life, as the starting point of creation. Unless, then, his primordial monad was also endowed with the principle of a human soul, when life was first breathed into it, it is evident that it could not transmit one to its descendants,—for there could not, possibly, be any chance variations of a principle which *did not exist*,—for Natural Selection to accumulate and develop.

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An Article on "The Canon of Scripture" is deferred until the next Number.

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ART I.—THE ORIGIN AND ANTIQUITY OF MAN: DARWIN, HUXLEY AND LYELL.

PART II.

Evidence as to Man's Place in Nature; by THOMAS H. HUXLEY, F. R. S., F. L. S. D. Appleton & Co. New York: 1863.

THIS work is especially designed for the popular mind. The author tells us, at the start, that he proposes to unfold his argument and set forth his facts, "in a form intelligible to those who possess no special acquaintance with anatomical science." Throughout his work, he carefully endeavors to bring his subject within the scope of the unlearned, though, at the same time, he affects to discuss it scientifically.

He had previously made an effort to influence the minds of the working classes of England, by oral and published Lectures "on the Origin of Species," in which he studiously seeks to disseminate the atheistical views embraced in Darwin's hypothesis, which we have already reviewed, in Part I. of this Essay.

In the present work, he continues this effort to bias the popular mind in favor of the doctrine of transmutation of species; and by an argument addressed to the unlearned, he aims to

prove that Man is either the lineal descendant from the Gorilla, or the progeny of a common stirps.

His book is divided into three parts :—

Part I. is a pleasant treatise "On the Natural History of the Man-like Apes,"—the evident intention of which is, to awaken an interest in his subject in the mind of the public, and prepare it for a favorable reception of his views. In regard to it we have nothing to say.

Part III. treats of the immense antiquity of some fossil remains of Man, with a view to establish the existence of a pre-Adamite race, holding a middle position between men and apes. As the same subject is more fully treated by Sir Charles Lyell, in his "Antiquity of Man," we will reserve our strictures on that head till we come to review his work.

Part II. of Mr. Huxley's book is by far the most important part, and contains all the evidence and the argument by which he attempts to establish his proposition. We shall therefore deal with this portion only,— the first Part being merely introductory, and the last, an application of his peculiar views.

Mr. Huxley opens his subject with these imposing words :

"The question of questions for mankind,—the problem which underlies all others, and is more deeply interesting than any other,—is the ascertainment of the place which Man occupies in nature, and of his relation to the universe of things. Whence our race has come; what are the limits of our power over nature, and of nature's power over us; to what goal we are tending;—are the problems which present themselves anew, and with undiminished interest, to every man born in the world."—page 71.

This statement is undoubtedly true in regard to Man's position as an intellectual and spiritual being; but it is in no manner true in regard to his anatomical position in the Animal Kingdom, as determined by his structural affinities to the brutes,—*which is the only view of the question taken by Mr. Huxley.*

He not only rejects from this question all recognition of Man's existence as a *spiritual being*, which alone gives it importance, but he also speaks, with ill-concealed contempt, of that Revelation which his spiritual nature demands, and which human reason declares to be the only source from which

any positive information can be derived in regard to the origin of our race, and the goal to which we are tending. It would seem to be a self-evident truth, that no power, save the Creator, can reveal the secret of man's origin, or his future destiny. Whether he has made such a revelation or not, is a fair subject for argument; but if He has not, then we must necessarily be satisfied to remain in ignorance, for human investigation is incompetent to solve the problem.

Mr. Huxley gives us to understand, at the outset, that his effort is antagonistic to Revelation, and seems to think that his scepticism redounds to the credit of his originality as a scientific investigator. In connection with the passage above quoted, he adds:—

"Most of us, shrinking from the difficulties and dangers which beset the seeker after original answers to these riddles, are contented to ignore them altogether, or to smother the investigating spirit, under the feather-bed of respected and respectable tradition. But, in every age, one or two restless spirits, blessed with that constructive genius which can only build on a secure foundation, or cursed with the mere spirit of scepticism, are unable to follow in the well-worn and comfortable track of their forefathers and contemporaries, and, unmindful of thorns and stumbling-blocks, strike out into paths of their own."

He thinks the importance of such an inquiry as he proposes, is intuitively manifested by the "sudden and profound mistrust of time-honored theories and strongly-rooted prejudices," awakened in the least thoughtful man when "brought face to face with these blurred copies of himself,"—the man-like Apes; but, "for all who are acquainted with the recent progress of the anatomical and physiological sciences," such mistrust of honored theories and dim suspicion of man's true position in nature, become *conclusions* from a "vast argument fraught with the deepest consequences."

No lover of truth has a right to complain of the most searching investigation into any matter which legitimately belongs to the domain of science, even if such investigation has a tendency to overturn our most cherished convictions and pre-conceived views of revealed Truth. But when the investigator goes out of his way to attack our convictions and destroy our faith in Revelation, by invoking the aid of science in support

of his own *speculations*, he ought not to complain if his facts and his argument are also subjected to a destructive analysis ;—and if his bantling cannot survive such a process, he must be content to see it perish.

If Mr. Huxley can prove that Man came not from the hand of his Creator, as a finished master-piece which was afterwards degraded through the machinations of the Devil,—but that he is the gradual development of a Marmoset, through a long series of monkies, baboons, and "man-like Apes," till, at last, he finds his immediate progenitor in the Gorilla,—if he can *prove* this, we must be content to acknowledge this origin, however ignominious, and however subversive it may be of Revelation. But it behoves us to examine, with the most jealous care, the so-called scientific grounds on which such an hypothesis is based, for it involves far more than the bare question of the origin of Man. Its establishment involves the destruction of the doctrine of the Fall of Man by sin, and of his restoration by Christ, which is doubtless one of those doctrines referred to by our author as "tolerable chiefly on account of the ignorance of those by whom it was accepted." Besides this, it is subversive of many other "respectable traditions," "time-honored theories and deeply rooted prejudices," with which the wisest and purest of mankind in every age have been persistently and consistently deluded, from the dawn of history, till 1863, when Mr. Huxley arose to dissipate, with the torch of science, these mists of ignorance and delusion.

We are not called upon for any countervailing argument in support of Revelation, for the burthen of proof rests entirely with Mr. Huxley, both as regards the falsity of the Scriptures and the truth of his own proposition. Our task is a plain one ; it is to carefully sift the facts and to rigidly scrutinize the argument which he advances. The task is enhanced in importance, while at the same time it is mingled with melancholy regret, by the fact that thousands of young men, who will never see these pages, will continue to read this popular volume, and will readily accept its scientifie sophistry, as a conclusive argument against that revealed Law to which their unchastened pride of reason refuses to be subject, solely "*because the car-*

nal mind is enmity to God." The truth of this divine declaration is fully attested by the personal experience of every thoughtful moral man, whatever may be his views of Revelation.

The philosophical question propounded in the opening words of our author, is indeed a most important one, for it embraces Man's advent upon this earth, his proper relation to the rest of the universe, his present moral dignity and his future destiny. But the subject is divested of all its grandeur, and assumes an entirely different aspect, the moment Mr. Huxley attempts its consideration. We learn, with infinite surprise, that this momentous question is to be settled solely by the aid of the "scalpel," and that Man's true place in nature, involving, as it necessarily does, his moral relations and future destiny, is to be determined by his *anatomical* position in a system of Classification. He assumes that structural affinities are proofs of identity of nature, and that structural differences between animals classified in the same Order, are sufficiently accounted for by the doctrine of *transmutation of species.* He argues that, as Man differs in physical structure from the Monkey tribe no more widely than some members of this extensive family differ from one another, he must be classed in the same Order with them,—and *therefore* we are bound to conclude that he has been derived from a common origin.

This is truly, as our author asserts, "a vast argument, fraught with the deepest consequences,"—for, if it be a sound one, we must admit that men and brutes are identical as to their nature; that at present they are in different stages of development, but that they are alike tending to the same goal, and advancing to a common destiny.

To this conclusion of "unity of origin of men and brutes," Mr. Huxley arrives, after setting forth numerous anatomical facts in support of his argument, which he constantly repeats in proof of his conclusion. The *vastness* of such an argument we freely admit, but we propose to show its entire *fallacy.*

"The facts, (says Mr. Huxley,) I believe cannot be disputed; and if so, the conclusion appears to me to be inevitable. But if Man be separated by no greater structural barrier from the brutes than they

are from one another, then it seems to follow, that if any process of physical causation can be discovered, by which the genera and families of ordinary animals have been produced, that process of causation is amply sufficient to account for the origin of Man. In other words, if it could be shown that the Marmosets,* for example, have arisen by gradual modification of the ordinary Platyrhini,† or that both Marmosets and Platyrhini are modified ramifications of a primitive stock, then there would be no rational ground for doubting that man might have originated, in the one case, by the gradual modification of a man-like ape; or in the other case, as a ramification of the same primitive stock as those apes."—p. 125.

He asserts that such a process of physical causation has been discovered by Mr. Darwin, and that his hypothesis is *just as true as the Copernican theory of the planetary motions.*

As Mr. Huxley makes the acceptance of his own conclusions to depend upon the truth of Mr. Darwin's doctrine, we might safely leave the question of man's place in nature to this arbitrament, since we have proved, in the preceding part of this Essay, that this doctrine is a baseless and visionary hypothesis. But Mr. Huxley also rests his conclusion on the anatomical facts which he has set forth in proof of his fundamental proposition,—

"That the structural differences which separate Man from the Gorilla and the Chimpanzee, are not so great as those which separate the Gorilla from the lower apes."

Now, we are willing to admit all of Mr. Huxley's anatomical facts, though we shall take large exception to their application ; but we entirely dissent from his "inevitable" conclusion, as being not only illogical in itself, but also as being a gratuitous corollary appended, inconsequentially, to his argument. We also undertake to prove that the argument itself is of no value in determining the great question propounded ; and that it is not only devoid of scientific merit, but that it is also eminently sophistical.

The first facts cited by Mr. Huxley are those which relate to development. These are introduced, not so much in direct

* Marmoset—a small animal of South America resembling a squirrel, but classed among the monkeys.

† Platyrhini—(*flat-nosed,*) a group of South American animals classed among the monkeys.

support of his position, as to prepare the minds of his readers for the easy acceptance of the doctrine of transmutation of species,—for unless this doctrine be admitted, all his other facts would be unavailable. He therefore lays great stress on the similarity which the human ovum bears to that of the dog, and still more, to that of the ape, to prove what he calls the structural "unity" of man and brutes, and that the physical processes of development are "identical." While we object to the use of the terms "unity" and "identical," as being deceptious, when all he can pretend to claim is *similarity*, yet we have no difficulty in admitting the facts which he adduces. Nobody doubts the fact, that the physical organization of man has great affinity to that of all animals belonging to the same great structural type, and particularly to those who are nearest to him in rank. What then? This similarity of structure is no evidence of identity of nature or origin. Nobody doubts that man belongs to the Animal Kingdom,—to the class of Mammalia,—and it matters little in regard to the question propounded by Mr. Huxley, whether he is placed in the same Order with the Apes, or in a separate one. We admit that the ova of a snake, fish, bird, dog, ape, and man, are all, in a certain stage of their existence, undistinguishable. What then? This does not prove that the ova of these animals are identical. On the contrary, the diversity of their future development proves that each has been impressed with a different law of being. Mr. Huxley cannot deny, nor does he pretend to, that these different ova are all *invariably* developed into animals of entirely *separate and distinct* species. What he is driving at, however, by this indirect argument, is the identity of origin and gradual transmutation of species. But this is a question of *fact*, in regard to which there is not a particle of evidence. What logical or philosophical connection is there between the similarity in appearance of ova which are *invariably* developed into distinct species of animals,—and the idea that a man may have been derived from an ape, and that an ape was once a dog? When has such a change ever taken place, in a single instance, to warrant us in assuming its possibility? Invariability in development presupposes immutability of be-

ing. Similarity in the appearance or in the processes of development of the ova of two distinct animals, is no more evidence that these animals can change the invariable law of their being, than similarity in the appearance or the revolution of two planets, is evidence that they may mutually change their fixed orbits and relations.

Scientific facts in regard to the similarity of ova, of fetal development, and affinity of structure adduced to support, inferentially, the doctrine of transmutation of animals, furnish at best but a specious and sophistical argument in favor of identity of origin. They are calculated to mislead the unlearned into the belief that such a process is natural and feasible; but they have not the slightest scientific weight in deciding the question at issue. The question of transmutation is one of *fact*, and can only be determined by positive evidence.

Preparatory to his grand conclusion that the Gorilla is the parent of Man, Mr. Huxley first seeks, with great labor and ingenuity, to place him in the same natural Order. Most of his subsequent facts are adduced with this intention; and he argues for this point, as if this change of classification would establish the necessary consanguinity. This position might be safely granted to him, so far as it has any true bearing on the great question under consideration. Man would be no less distinctively *human*, by proving, as Mr. Huxley aims to do, that the Gorilla is also a *bimanous biped*, and should, accordingly, be ranked in the same Order of "Primates." The true position to be established is *identity of nature*, from which identity of origin might be properly inferred,—not *anatomical similarity*, which determines only the ordinal rank which we may deem proper to assign to an animal, in our varying systems of classification.

The argument by which our author attempts to prove this position, in order to deduce from it his preposterous corollary of Gorilla parentage, is precisely the same which he repeats in proof of every other point, and is founded solely on the proposition, "*that the differences between Man and the Gorilla are of smaller value than those between the Gorilla and some other Apes.*" He argues that Man differs "less from them (the

Apes) than they from one another, and *hence* must take his place in the same Order with them."

Such an argument would be admissible, if the only point at issue were the correctness or consistency of an arbitrary scientific classification,—but applied, as it is by Mr. Huxley, to establish Man's unity of nature with the brutes and his descent from the Gorilla, it is certainly very illegitimate, if not absurd.

Having secured, in the Quadrumana,* a very extensive field of comparison, he proceeds to enumerate, consecutively and with great minuteness, the differences in the proportions of the arms, legs, hands, feet, vertebra, ribs, pelvis, skulls and teeth of men and gorillas, to show that the lower Quadrumana differ as much from the Gorilla in these respects, as the last does from Man. He argues that these facts seem to him "to leave us no choice," but to place Man and the Gorilla in the same Order; and the conclusion which he deduces from this argument, by way of corollary, is, that Man is descended from the Gorilla!

It must be borne in mind, that Mr. Huxley does not attempt to show a gradational elevation, in respect to the several parts enumerated, from the lowest to the highest Apes, culminating in the Gorilla, and the same gradational elevation continued in Man, with no greater difference between him and the Gorilla, than exists between the latter and the next highest Ape. Such a showing, if it could be made, would furnish a pertinent argument; but Mr. Huxley attempts nothing of the kind, though he gives to the unlearned reader the impression that such is his line of argument. But to understand the scientific value of the argument, as presented by Mr. Huxley, the reader must be informed that he takes for his field of comparison the whole Order of the Quadrumana, including even the Cheiromys, (Rat with hands,) which Cuvier classes with the Squirrels, and the Galeopithecus, (Flying Cat,) which Cuvier places among the Bats. This Order comprises over a hundred species of animals, widely differing from one another in form and structure, many of them approaching, in their characteristics, to carni-

* Quadrumana, (*four-handed:*) an Order comprising apes, monkeys, and many animals very diverse in form, but classed together (with some hesitancy) by Cuvier, from the fact that they all have prehensile feet or hand-like claws.

vora, insectivora, and rodentia, resembling dogs, cats, foxes, squirrels, and even bats, in general appearance, more than the highest Apes,—but all classed together in one Order, from the fact that all have four prehensile or *hand-like* paws. Now, Mr. Huxley, in comparing the differences between a man and the Gorilla, picks out some one of these hundred species, to show that it exhibits just as much or more difference. It makes no matter with Mr. Huxley, whether the particular difference under consideration be found in the lower animal in excess or defect,—in the ascending or descending scale, in reference to man as the standard,—it is sufficient for his argument, that the particular difference be as great or greater, than the same existing between Man and the Gorilla.

He might use precisely the same argument, and cite precisely the same particulars, to prove that Man is next of kin to the Bear, which stands in Cuvier's next Order of carnivora. This Order is still larger than the first, and is composed of denizens of the air, water, land, and under the land ; comprising bats, sea-cows, kangaroos and moles, besides the numerous tribes of carnivorous quadrupeds inhabiting the surface of the earth. Now, in whatever respect a Bear differs from a man, it would be easy for him to find some animal in this miscellaneous category, differing still more widely from the Bear, and therefore, according to his argument, Bear and Man must be placed in the same Order. Appending his corollary with as much propriety in this case as in the other, he would come very satisfactorily to the conclusion, that Man is descended from the Bear. This would be rather an improvement upon his friend and tutor, Darwin, who can see no difficulty in a bear becoming the progenitor of whales.

In closing his citations of one set of examples, Mr. Huxley makes a very pertinent remark, which we underscore.

"These examples (he says) might be greatly multiplied, but they suffice to show, that in whatever proportion of its limbs the Gorilla differs from Man, the other Apes depart still more widely from the Gorilla, *and that, consequently, such differences of proportion can have no ordinal value.*"

This is exactly the truth, and is, as we think, inconsistent with his argument. These, as well as all other differences enu-

merated by him, can have *no ordinal* value, either to advance the Gorilla into the same Order as Man, or to degrade Man into the same Order as the gorilla. It is not our intention, at present, to combat the opinion of Mr. Huxley, that Man and the Quadrumana ought to be placed in the same Order of Primates. Nor is there any necessity for doing so. This, or any other classification of Man's *body* in the Animal Kingdom, can have no proper bearing on the momentous question propounded by Mr. Huxley, nor has it any logical connection with his argument,—neither does it lend any support to the preposterous conclusion at which he arrives. We wish, at present, simply to expose the scientific invalidity of his argument, and show how his specious and deceptious presentation of it is calculated to mislead the unlearned reader, for whom this book, as the author informs us, is chiefly prepared.

Mr. Huxley reserves, for separate and special consideration, the Foot, Hand, and Brain, upon which, he says, so much stress has been laid for establishing supposed structural distinctions between Man and the Apes. He accordingly gives to each a careful examination, and derives from them his strongest reasons for placing Man and the Gorilla in the same Order, which, with him, is tantamount to establishing unity of origin and community of nature.

Mr. Huxley seems to think that if he can show that the foot, hand, and brain of the gorilla are similar in structure to the corresponding organs in man, and do not present any greater differences than those which occur among animals which are classified in the same Order as the gorilla—that he will then have proved man's consanguinity with this brute. He forgets that if he were able to show not only the similarity, but the absolute identity of structure of these organs—yet, if man possess *distinctive* attributes and characteristics which the gorilla does not possess, such differences would render nugatory all points of similarity which might be adduced to show unity of origin or identity of nature. Such differences, Mr. Huxley admits to exist, as we shall have occasion to point out in the sequel. Waiving all physiological, intellectual and moral differences—the argument that structural differences are not essen-

tial or fundamental, because as great or greater ones occur in animals which have been placed in the same Order as the gorilla, has no weight except in regard to a question of correct scientific classification. It has not the slightest scientific value in determining man's affinity to the gorilla.

The first of the three great points of anatomical resemblance upon which Mr. Huxley relies to prove man's descent from the gorilla, is the fact that the latter animal has a *foot*, and therefore has been improperly classified by Cuvier as quadrumanous, or *four-handed.*

He labors to prove that the hind paws of the gorilla are true feet, in order to bring man down from the isolated pedestal on which Cuvier and other naturalists have placed him, into the same rank as the apes; and by thus placing both in one and the same order of "Primates," he imagines that he has conclusively proved their unity of origin, and established man's true place in Nature.

He admits that

> "At first sight the termination of the hind limb of the gorilla looks very *hand-like*, and as it is still more so in many of the lower apes, it is not wonderful that the appellation 'quadrumana,' or four-handed creatures, adopted from the older anatomists by Blumenbach, and unfortunately rendered current by Cuvier, should have gained such wide acceptance as a name for the Simian group."—p. 108.

Cuvier uses the word *paws* ("pattes") in speaking both of the fore and hind extremities of the quadrumana, which he describes as having four *hands*, but he was just as far from admitting that they had *true* hands, as that they had *true* feet, according to the human standard. He very justly considered the prehensile character of their hind paws more analogous in function to hands than to feet, and therefore classified them according to this peculiarity—in contradistinction to other brutes who were properly quadrupeds, and to separate them anatomically from man, who is the only proper two-handed or bimanous animal. The true bearing of Mr. Huxley's argument is against this classification of Cuvier, which, like all other classifications, is more or less arbitrary. It has really nothing to do with the great question which he proposes to solve, and

its only value is to show that Cuvier, according to Mr. Huxley's view of classification, committed a blunder by designating apes as quadrumanous; since they have feet as well as hands, and therefore, according to him, are as much entitled as man to be ranked as bimana. It is very apparent that his argument is based on a verbal quibble; a supposed misuse of a term, and its only logical bearing is against Cuvier's nomenclature. The fact which Cuvier recognized is, that these animals have neither true hands nor true feet, according to the *human* standard, but paws, which present many striking resemblances to human hands and feet.

In order to prove that the gorilla is a *bimanous biped* like man, Mr. Huxley first establishes a rule to enable us to have "distinct and clear ideas of what constitutes a hand and what a foot." He contrasts the bones of the human hand and foot, and shows, while there is a general similarity and "some singular resemblances" in their homologous parts, yet "there is a *fundamental* difference in the structure of the foot and hand," which constitutes them distinct organs. Among the singular resemblances he notices, in contrast with the artificial immobility of the "civilized great toe," the "great amount of mobility, and even some sort of opposability," of the great toe among uncivilized and barefooted people, which enable them to discharge with the foot some of the offices of the hand. The object of this remark is obvious. He would like to insinuate that there are some people who might, just as properly as the gorilla, be considered quadrumanous in consequence of the prehensile character of their feet. He concludes, however, that, notwithstanding such resemblance, there is a fundamental difference between the great toe and thumb—for he tells us, "though after all it must be recollected that the structure of its joints and the arrangement of its bones *necessarily* render its prehensile action far less perfect than the thumb."

It is important here to note, that if the human foot had been prehensile, like the hand, the above structural difference between the toe and the thumb would not have been considered by our author as fundamental. Admitting this, it follows legitimately, that if we find the hind paw of the ape as prehensile as the

fore paw, then there is no fundamental difference in the design and function of these organs, although differing in structure. It also follows, that if the hind paw of the ape is just as prehensile as the fore paw, there must necessarily be a fundamental difference between it and the *human foot*, which is not prehensile, however similar they may be in structure.

He next compares the muscles of the human hand and foot, showing the general similarity and special differences, and finally arrives at the conclusion, that a foot is distinguished from a hand by the three " following absolute anatomical differences :

" 1st. By the arrangement of the tarsal bones.
2nd. By having a short flexor and a short extensor muscle of the digits in place of a long one in the hand.
3rd. By possessing the muscle termed *peronæus longus*."

He proceeds to apply these tests to the hind paw of the gorilla, and acknowledges that there are many important differences, some of which he specifies ; but these give him no trouble whatever. They vanish in the presence of his *unique argument* which he uses as a panacea for all difficulties, and advances as proof on all disputed points. Whenever he encounters a troublesome difference between man and the gorilla, he calls up some other member of the ape family to show that *he* departs just as widely from the gorilla standard, and *therefore* (!) this difference between the gorilla and man is not fundamental. In regard to this point of difference he says,

" I have dwelt upon this point at length ; because it is one regarding which much delusion prevails ; but I might have passed it over without detriment to my argument, which only requires me to show that, *be the differences between the hand and foot of Man and those of the Gorilla what they may*—the differences between those of the Gorilla and those of the lower Apes are much greater." p. 110.

The absurdity of such an argument will unfold itself as we proceed.

Notwithstanding the many striking departures from the human standard, he comes to the conclusion that " The hind limb of the Gorilla, therefore, ends in a true foot with a very moveable great toe ; it is a prehensile foot, indeed, but in no sense a hand." We entirely concur in the conclusion, that the go-

rilla has a prehensile foot; indeed, nobody has ever doubted the fact. But a *prehensile* foot is not a true foot, according to the human standard, which is the point he seeks to prove. The articulations and the arrangement of the bones and muscles of the human foot, according to his own showing, *necessarily* prevent its becoming prehensile. Nobody ever doubted that the hind paw of an ape was a *foot* in the general sense of the term, though it is not quite so human in aspect and function as the hind paw of the brown bear and other plantagrades. Cuvier frequently speaks of the hind paws of apes as "feet," and it was precisely because they had feet which were prehensile and grasping, like a hand, that he named them quadrumana. The above conclusion, which Mr. Huxley has arrived at so laboriously, would be agreed to by Cuvier and every one else, for it is a *self-evident* fact.

But Mr. Huxley goes somewhat further. He says this foot "is in no sense a hand." Here he is at variance with Cuvier and all the rest of the world. A foot which is prehensile, and can grasp with perfect facility, and perform other functions of the hand, is certainly, in some sense, a hand, according even to the human standard. But the hind paw of a gorilla, which can grasp and perform all the other functions of the hand, nearly, if not quite, as perfectly as the fore paw which Mr. Huxley asserts to be "*a true hand*," is, in function and design, completely a hand, according to the gorilla standard of a hand.

So far Mr. Huxley's effort to solve the momentous "question of questions for mankind," which he has proposed, seems to amount to nothing more than an attack upon Cuvier's nomenclature, based on a supposed misnomer of an ape's paw; but he goes a step further in the conclusion which we have partly quoted above. He adds: "It is a foot which differs from that of man not in any fundamental character, but in mere proportions, in the degree of mobility, and in the secondary arrangement of its parts."

The truth of this assertion we deny. Of all animals, the foot of man alone is so constructed that it is capable of supporting the body constantly in an erect position, and of serving exclusively as the natural organ of locomotion. This constitutes a

distinguishing peculiarity in the anatomical structure of man, which is in direct correlation with the rest of his organism, and bespeaks him an intellectual and spiritual being, as well as the only erect animal. For, in consequence of this structure, the superior limbs are withdrawn from locomotion, and are constantly free to obey the behests of the mind for æsthetical, intellectual, and spiritual purposes.

Professor Dana has been the first one, we believe, to recognize this "cephalization" of the anterior limbs as an authoritative basis for zoological classification and establishing man's *isolation* and preëminence in the animal kingdom. In a short article published in the "New Englander," for April, 1863, he says,—"Man is alone among mammals, in having the forelimbs withdrawn from the *locomotive* series and transferred to the *cephalic* series. The fore limbs in him serve primarily the purposes of the head, and are not for locomotion. A very large anterior portion of the body is thus turned over to the service of the head, so that the posterior or gastric portion of the animal reaches in man its minimum. Here, then, is a degree of *cephalization* of the body—that is, of subordination of its members and structure to head uses—which separates man widely from other animals, placing him, literally, alone."

Now the case is entirely different with the gorilla and the other "man-like apes." With them the anterior limbs are necessary organs of locomotion, as much so, indeed, as the posterior limbs. Both feet and hands perform this office very imperfectly on the surface of the ground, which is not the natural habitat of these animals. The structure of their feet does not admit of the easy application of the sole to the ground as in man, but the body is supported and propelled on the outside of the foot, aided by the knuckles of the hand. As the hand is a necessary organ of locomotion, so also the foot is designed by its structure to perform the functions of a hand, nearly, if not quite, as perfectly as the so-called hand. In fact, both are prehensile grasping organs, fitting these animals to climb and dwell in trees, which is their natural abode, justifying the appellation of quadrumanous, which Cuvier gives them in his classification. While the same bones and muscles which exist in the human

foot may be found in that of the gorilla, yet they are so arranged and modified as to perform very diverse functions, and indicate animals very diverse in nature.

But Mr. Huxley contends that similarity of anatomical parts, irrespective of functional or other differences, is proof that man belongs to the same Order as the gorilla, and therefore should be considered evidence of identity of nature and origin. He demands that there shall be some additional organ, or, what he calls, some absolute fundamental difference of structure of the same organ, in order to establish ordinal distinction and diversity of nature.

We will answer his demand for some specific anatomical difference of structure, by citing the *flexor longus pollicis*, which in man is inserted in the great toe alone, while in the gorilla it is distributed to the other toes, thus contributing to that prehensile or grasping faculty, which gives to the foot of this animal the function and character of a hand. We might also cite another fundamental difference belonging to the teeth, which organs have always been regarded as affording reliable distinctions for separate classification. The gorilla, in common with other apes, has invariably well-marked projecting tusks, with the accompanying *diastema*, or interval, in both jaws; while this *brutal* peculiarity is constantly wanting in the human dentition.

We cite these anatomical differences, to which many others might be added, not because we attach any importance to them in determining man's separation from the gorilla, but simply in compliance with Mr. Huxley's demand, and in order to show the weakness of his argument, which seeks to establish identity of nature from similarity of anatomical parts.

In order to appreciate fully the fallacy of his argument, let us suppose that a race of animals should be discovered similar to gorillas, equally devoid of speech and abstract reasoning, with feet as prehensile as their hands, fitting them to climb trees with equal facility, but presenting constantly the sole difference of an additional toe, thereby enabling them to walk the earth as erectly as a man. Now, upon his principles, such an animal must be considered, in virtue of this anatomical differ-

ence, superior to the gorilla, and be placed in a different and superior Order ; while man, presenting characteristic differences vastly, nay, infinitely greater, must, for the want of this sixth toe, be classed amongst these lower brutes, as identical in nature and origin, and only differing from them in the degree of development.

Mr. Huxley examines the *fore paw* of the gorilla, or as he calls it, the terminal division of the fore limb, much less minutely than the foot, for he thinks there can be no question as to its being a true hand. He says :

"The terminal division of the fore limb presents no difficulty—bone for bone, and muscle for muscle are found to be arranged essentially as in man, or with such minor differences as are found as varieties in man. The Gorilla's hand is clumsier, heavier, and has a thumb somewhat shorter in proportion than that of man; *but no one has ever doubted its being a true hand.*" p. 108.

This is certainly a very bold assertion, as well as a very untrue one, in view of the contrary opinion held by many eminent naturalists; and the only evidence he brings in proof of it, is his usual *catholicon*, viz., that the hand of other members of the monkey tribe, especially of the marmoset, whose thumb, he says, is a mere "curved claw like the other digits"—"is more different from that of the Gorilla than the Gorilla's hand is from Man's"—which, he tells us, is all that his argument requires him to show ! With the exception of the *Cheiromys*,* which he cites on another occasion, he could not have selected a better example to show the worthlessness of his argument. He picks out for a comparison of *hands*, a little squirrel-like quadruped, whose thumbless fore paws are just as much hands as a squirrel's and no more—and who, had he the teeth of his brother cheiromys, might also have been ranked among squirrels; but inasmuch as all four of his feet are prehensile claws,

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* Cheiromys (*Rat with hands*), or Madagascar rat. This animal having the tail and teeth of a squirrel, is classed by Cuvier among the "Squirrels." Our author however, in virture of its prehensile claws, and some other resemblances, has placed it in the same Order as the gorilla; and he cites, on page 101, its *difference* from the gorilla, in regard to teeth, as *evidence* that man should be placed in the same Order as these animals!

he has been placed among the Quadrumana, which Order embraces also the gorilla, and thus enables Mr. Huxley to institute his comparison.

Mr. Huxley, however, contends that the gorilla is not a quadruman (though he is so called) inasmuch as he has proved that he has true feet and true hands, the same as man; but his argument requires him to go further, and prove that the marmoset (whose hand he terms a claw) is also not a quadruman, and that he too has true feet and true hands according to the human standard. If he cannot prove this he must leave the marmoset among the Quadruma, and place the gorilla in a *different* Order. But if he separates the gorilla from this Order of Quadrumana—then his comparison is not legitimate, and his argument falls to the ground;—for as it is based on the assertion "that the hand (of the marmoset) is more different from that of the gorilla than the gorilla's hand is from man's,"—it is only by showing that these animals, presenting such great differences, belong to the *same* natural Order, that he can advance it in proof that man also, despite his differences, should be included in the same Order with them. On the other hand, unless he proves that the marmoset, like the gorilla, is also a *bimanous biped*, he has no right to place him in the same Order for the purpose of instituting a comparison of *hands*. We think he will find it impossible to transmute the claws of this little animal into true hands and feet according to the human type; and until he brings proof to the contrary, the little fellow must remain either a quadruman or a quadruped. In either position, the marmoset cannot hold the same ordinal rank with his *biped* gorilla, and is therefore unavailable as a subject of comparison, and fatal to Mr. Huxley's argument, which demands that both animals shall be in the same Order.

We will, however, allow Mr. Huxley to assume, with manifest inconsistency, what he ought to have proved, and will grant him the right to institute his comparison, whatever may be the diversity of structure of these animals, and to consider them as being in the same Order, whatever name they may be called by. Under these circumstances, let us see what is his invariable argument in this case, as well as in all others, by which he seeks to

prove that man is in the self same Order as the gorilla, and has the self same origin and nature.

It stands thus : Because the anterior *claws* of the marmoset (which is called a quadruman) differ more widely from the fore-*paws* of a gorilla (which is also called a quadruman) than these do from the *hands* of man (who is not a quadruman);—therefore, the differences of the human hand, "*be they what they may*," are not fundamental nor distinctive ! *Hence* man must take his place in the same Order as the gorilla and marmoset ! ! Consequently, the *unity* of origin and nature of man and the gorilla follows as a necessary corollary ! ! !

In other words, because certain differences in the organs of two animals which happen to be placed in the same Order, (one at the head and the other at the tail) are greater than those which are presented by *similar* organs of a third animal which is *not* in that Order—therefore, this latter animal must be ranked in the same Order as the other two, let the differences of these organs, as well as other differences, be what they may—and also be considered identical in nature. Mr. Huxley might just as well argue that, because the five-digited, not horny-hoofed foot of the elephant (a Pachyderm *) differs more widely from the single-cleft horny-hoofed foot of the hog (also a Pachyderm) than this last does from the single-cleft horny-hoofed foot of the sheep (a Ruminant).—Therefore the foot of the sheep is evidence that he belongs to the same Order as the hog—for *be the differences between the foot of the sheep and the hog what they may, the differences between that of the hog and the elephant are much greater.* Mutatis mutandis—this is precisely in his own terms, Mr. Huxley's plea for the gorilla, and this he thinks is all that his argument requires him to show in order to prove his unity with man !

Such an argument, in the way that it is presented by Mr. Huxley, would be illogical, as well as unscientific, if it were used simply to determine a question of correct *classification ;* but applied, as it is by him, to establish man's unity with the

* Pachy dermata (*thick-skinned*); an order which comprises the elephant, rhinoceros, and the like animals, and also includes the hog and the horse.

brutes in regard to *origin* and *nature*,—it is not only worthless but absurd.

But Mr. Huxley thinks that argument is not necessary to prove that the terminal division of the gorilla's fore limb is a hand according to the *human* standard. He boldly asserts, "*that no one has ever doubted its being a true hand.*" In flat contradiction to this bold assertion we cannot do better than quote the opinion of M. Gratiolet,* a French anatomist, whose scientific authority cannot be questioned by Mr. Huxley, since he frequently cites it in opposition to Professor Owen, in his "History of the Controversy respecting the Cerebral Structure of Man and the Apes."

According to Gratiolet there are—

"Profound and really typical differences between man and the most elevated apes. In the latter, the thumb is bent by an oblique division of the common tendon of the muscle, which moves the other fingers, and therefore is not free. This type is realized in the gorilla and chimpanzee, but the small tendon which moves the thumb is in these reduced to a tendinous thread, which exerts no action, for its action is lost in the synovial folds of the tendons, which bend the other fingers, and it abuts on no muscle; the thumb therefore in these apes is wonderfully enfeebled. In none of them is there a trace of the large independent muscle which gives movement to the human thumb. Far from becoming more strongly developed, the member so characteristic of the human hand, seems in the most elevated apes, the orangs, to incline to a complete annihilation. These apes, therefore, have nothing in the organization of their hand which indicates a passage into the human form, and I insist, in my memoir, on the profound differences revealed by the study of the movements in hands formed to accomplish objects of a totally distinct order. Besides, it is especially in the ape, in appearance most like man, the Indian orang, that the hands and the feet present the most striking degradations. This paradox—this default in the parallelism in man and the large apes, in the development of correlative organs, such as the brain and the hand, shows absolutely that other harmonies, and other destinies, are here in question."

In a discourse delivered at one of the free Scientific Soirees of the Sorbonne, M. Gratiolet says—

"The hand of an ape is but a prehensile hook. Is the liberty of the thumb, which is wanting in the small apes, present in the anthropoids? Does the tendon which moves it, abutting on a distinct muscle, permit it to move more freely? Far from it,—this tendon is lost, and the

* See the "London Reader" for 1864, Nos. 66 and 87.

force of the thumb disappears. The organ, instead of being perfected, is degraded; scarcely can the long hooked fingers, when bent, touch one by one the unguial extremity of the thumb; the nail which terminates them is short, deformed, inflexible; it (the hand) is already a claw."

He goes on to show that it is not adapted to sense or touch, or to the acquisition of intellectual ideas,—but to the cylindrical boughs of a tree, from its curving and hook-like shape. Besides, this hand is the habitual organ of a quadrupedal motion, and its true resting place is not the ground, but trees. The hand is free only when the animal is at rest. He then remarks :—

"What a difference is there in the hand of man! The thumb becomes larger; it acquires a prodigious force and a freedom almost without bounds. Its tactile ball opposes itself with complete independence, simultaneously, or turn by turn, to those of all the other fingers. These, covered at their extremities with elastic nails, realize all the conditions of an organ proper to measure the intensity of pressure. The palm of the hand of an ape can only apply itself to a cylinder; that of the human hand is able to hollow itself into a longitudinal gutter, or to fashion itself into a cup, in such a manner that it can apply itself to spherical surfaces. From a simple prehensile organ it becomes a measuring instrument;—from a hook it becomes a compass (an expression used by Blainville), and the compass presupposes the geometrician. Elle saisissait jusque là le sol ou l'aliment; desormais, passez moi le mot, elle pourra saisir aussi des idées."

Mr. Huxley concludes his essay by a critical examination of the Brain, which, he thinks, illustrates the truth of his proposition more clearly than either the Hand or Foot, and "enforces the same conclusion in a still more striking manner." In comparing the Simian brain with the human, he drops the Gorilla, and very properly takes the Chimpanzee and the Ourang, as the highest exemplars. We are surprised that he had not, from the first, recognized these animals as the most elevated of the Ape family, instead of the Gorilla. Apart from the statements of our countrymen, Dr. Savage and Mr. Ford, published in 1847 and 1852, little was known of this brute till Mr. Du Chaillu brought to this country his interesting collection. Those who have seen his skeletons and stuffed specimens of the Gorilla, will remember the exceedingly brutal aspect of this animal, which accords well with Du Chaillu's

statements in regard to its brutal ferocity. Except in size, and in the less length of its fore limbs, it departs much farther, in structure, from the human standard, than do the Chimpanzee, the Ourang, or even the Gibbon; and is much inferior to them in intelligence, as well as in physical organization.

Mr. Huxley demonstrates, in the Chimpanzee and the Ourang, the existence, to some extent, of the third lobe of the brain, the posterior cornu of the lateral ventricle, and the hippocampus minor, all of which were held by Owen to be peculiar characteristics of the human brain.

So far as cerebral structure goes, he says, "that the difference between the brains of the Chimpanzee and of Man is almost insignificant, when compared with that between the Chimpanzee brain and that of a Lemur.*" This we may consider as true, since these animals, though embraced in the same Order, are almost as widely removed from one another as a Bear is from a Bat, which are also both in the same Order. But Mr. Huxley admits that there *is* a structural difference, though comparatively small, and freely acknowledges the "very striking difference in absolute mass and weight, between the lowest human brain, and that of the highest Ape."

This difference is indeed immense, when we consider that one of the skulls measured by Morton, contained 114 cubic inches, while the most capacious Gorilla skull, according to Mr. Huxley, contains not more than 34½ inches. An ordinary child of four years old has a brain, absolutely, twice as large, and relatively ten times as large as an adult Gorilla. Mr. Huxley considers that this immense difference of size "is a very noteworthy circumstance, and doubtless will one day help to furnish an explanation of the great gulf which intervenes between the lowest man and the highest ape, in intellectual power." p. 120.

We wish to call the reader's particular attention to this quotation, in connection with the note which accompanies it, in order to show the specious sophistry with which Mr. Huxley, throughout this book, endeavors to get up a case for the popu-

* Lemur, a nocturnal carniverous animal, resembling the fox, but presenting many varieties of form. They are classed among the Quadrumana,—but Cuvier classes the *flying Lemur* among the Bats.

lar mind, and in order also to point out an admission, fatal to his doctrine, of man being a developed ape.

From this quotation we might infer that he considered the brain of an ape and that of a man to differ only in *quantity* or quality, and not in *structure*, and that the present "great gulf" would be bridged over, when we discovered other apes, recent or fossil, with more capacious skulls. But in the note, he tells us plainly, that this is not his meaning :—

"For I by no means believe (he says) that it was any original difference of cerebral quality or quantity, which caused that divergence between the human and the pithecoid stirpes, which has ended in the present enormous gulf between them."

The long note from which the above is extracted, is directed against an objection founded on the argument that all difference of function is a result of difference of structure (which he does not deny) and therefore that "the vast intellectual chasm," which he admits to exist between Man and the Apes, implies a correspondingly vast structural chasm between their brains. In combating this argument, he incautiously goes on to show, that the immense difference between a Man's intelligence and an Ape's, is caused by speech and some peculiarity in the structure of their brains, so *slight* as to escape notice. He illustrates his own opposing argument by the example of the "great gulf" existing between a watch that keeps accurate time, and one that will not go at all, in consequence of some very slight physical alteration. Thus, he says,—

"A hair in the balance-wheel, a little rust on a pinion, a bend in a tooth of the escapement, a something so slight that only the practised eye of the watch-maker can discover it, may be the source of all the difference. And believing as I do with Cuvier, that the possession of articulate speech is the grand *distinctive* character of man, (whether it be absolutely peculiar to him or not,) I find it very easy to comprehend, that some equally *inconspicuous structural difference* may have been the primaary cause of the *immeasurable and practically infinite divergence* of the Human from the Simian Stirps." See Note on p. 122.

Now Mr. Huxley, in the above note, very plainly admits a distinctive fundamental difference between men and apes; and the reader might reasonably conclude, that he had abandoned,

in despair, his position of Man's unity with the brutes, since he acknowledges a *structural* difference, which places an immeasurable chasm between them. Such is the clear teaching of the note; but we have yet to learn all the capabilities of Mr. Huxley's "vast argument," and the flexibility of his peculiar logic. Notwithstanding the fatal concessions contained in his foot note, he maintains in his text precisely the same position of Man's unity with the Apes, and finds in the immense disparity in the weight of their brains, additional confirmation. He also employs precisely the same invariable argument, save only in this case he bases it, not as before on differences among apes, *but on differences among men themselves.*

Taking the admissions in his note, in connection with the text to which it is appended, his position and argument stand thus:—The immense size of the human brain, the peculiarity of its structure, and the distinctive faculty of speech, which cause an "immeasurable and practically infinite divergence of the Human from the Simian Stirps," are all of "little systematic value," in assigning to Man a distinct place in Nature, or a different origin from an Ape. Why? Because "the difference in the weight of brain between the *highest and the lowest men* is far greater, both relatively and absolutely, than that between the lowest man and the highest ape." In other words, *because* the largest brained man among European philosophers (Cuvier* for instance,) surpasses, in the size of his brain and intelligence, the most debased specimen of a semi-idiotic tribe of Bosjemen, as much as the latter surpasses the highest ape, *therefore*, he concludes that this fact furnishes additional proof that Man belongs to the same Order as the monkey, and is the production of a gorilla!

According to this reasoning, the more a civilized man becomes developed by cultivation, and the more strongly he manifests that unlimited capability of improvement which is distinctive of human nature, the greater is the evidence of his bestial origin. For it is apparent, that if the human race

* Cuvier's brain (the heaviest male brain on record) weighed 1861 French grammes, nearly 5 lbs., Troy weight.

were now composed entirely of men as degraded as the lowest Bosjeman, there would be no room for Mr. Huxley's comparison of differences, nor for the illogical inference which he draws from the superiority of the civilized over the savage brain. Under this condition of universal degradation, the "infinite divergence" which he admits to exist between the lowest Bosjeman and the highest Ape, would have to be considered evidence of diversity of nature and origin. For, even if he maintained, as he does in the text, that the size of the brain is of little systematic value, yet its "structural difference" and the faculty of speech, which he acknowledges in his note, and to which other still more distinctive characteristics might be added, would, upon Mr. Huxley's own principles, sufficiently establish this diversity.

But, because Man has been degraded from a superior state to the condition of a semi-idiotic Bosjeman, or because from some inherent principle of *improvableness*, he is capable of unlimited progress in the scale of elevation,—for it matters not which theory is adopted,—therefore, according to Mr. Huxley, the great disparity between the civilized and the savage brain, becomes a logical part of that "vast argument, fraught with the deepest consequences," which he proposes to unfold, in order to prove that Man is descended from a monkey!

Is the "enormous gulf" between the lowest Bosjeman and the highest ape rendered any less, because there are Europeans who exceed him in the size of the brain and in intelligence, as much as he exceeds a gorilla? Is savage man to be classed with the brutes *because* civilized man is proportionally elevated above him? Does his capability of unlimited improvement bridge the "great gulf" between him and the gorilla, and prove identity of nature? What logical connection is there between his premiss, based upon this superiority of Man's nature, and his conclusion that he is therefore of bestial origin? Who can fail to see the utter absurdity of such an argument, applied to determine Man's true position in nature, and his relationship to the universe of things? For it must be well remembered that this is the great question (not his anatomical position) which our author proposes to solve by this argument,

and to the solution of which he says every good citizen ought to feel bound to contribute, "even if he have nothing but a scalpel to work withal." Yet such reasoning, and such style of argument, is the only contribution which he makes towards its solution.

We think Mr. Huxley would have acted more wisely if he had stuck to his scalpel, as a good practical anatomist, as he undoubtedly is, instead of ambitiously attempting to solve a great philosophical question, by arguments which prove that he has yet to learn the very alphabet of a sound logical philosophy. As a general rule, he argues that Man ought to be classed with the Apes, because some members of the extensive Order of Quadrumana, as for instance the Flying Cat, or the Madagascar Rat, or the squirrel-like Marmoset, differ from a gorilla, as much as a gorilla differs from a Bosjeman. But, when he is forced to admit that there is an "infinite divergence" between a gorilla and a Bosjeman, dependent upon what he acknowledges to be *distinctive* and *structural* differences, he would have us to believe that this is of no account, because there are cultivated men who surpass the most debased specimens of the race, as much as these last surpass the highest Apes.

This argument of *differences*, in the manner in which he employed it before, was, as we have seen, absurd enough; but when he undertakes to make the differences among men, arising from their capability of indefinite progress,—which is a distinctive characteristic of the superiority of human nature,—an argument to prove man's inferiority and unity with the brutes, its illogical absurdity becomes so *intense*, that there is no word in the language sufficiently strong to characterize it.

The fact that men differ so widely from one another in elevation, and are so capable of indefinite improvement,—while the identity of nature of all men is universally admitted,—is of itself conclusive proof that their nature, and consequently, that their origin must be diverse from that of the brutes, which admit of no such progress, and of no such corresponding debasement.

Mr. Huxley, in his concluding remarks, offers a defense

which sounds more like an apology for his preposterous conclusion. He says that the opposing argument, founded on Man's moral differences, "would have my entire sympathy, if it were only relevant," and that it is not he that "seeks to base Man's dignity on his great toe, or insinuate that we are lost, if an Ape has a hippocampus minor." In the next breath he exclaims :—"At the same time, no one is more strongly convinced than I am, of the vastness of the gulf between civilized man and the brutes ; or is more certain that whether *from* them or not, he is assuredly not *of* them." What is this but an involuntary confession on his part, that there is an impassable separation between man's nature and that of brutes, arising either from *moral* or structural differences; and, in either case, how can he consistently contend for their unity of origin and identity of place in Nature ?

He scouts at the idea, "that the belief in the unity of origin of man and brutes, involves the brutalization and degradation of the former." He thinks a sensible child could confute such an opinion. So he might, if he could prove that unity of origin was properly connected with entire *diversity* of nature and characteristic attributes. The argument which he himself uses to confute this opinion, is in these words :—

> "Is it indeed true that the Poet or the Philosopher or the Artist, whose genius is the glory of his age, is degraded from his high estate by the undoubted historical probability, not to say certainty, that he is the direct descendant of some naked and bestial savage, whose intelligence was just sufficient to make him a little more cunning than the Fox, and by so much more dangerous than the Tiger."

His "sensible child" would very promptly reply, 'certainly not, because in this case, *unity of origin* is very properly connected with *identity of nature*, and that nature is characteristically susceptible of indefinite improvement, which accounts for all the difference.'

Besides, it is entirely a gratuitous assumption on the part of Mr. Huxley, to suppose that the civilized man is, ab origine, the direct descendant of the savage. The records of man, historic and monumental, in every nation and in every race, pro-

claim that barbarism is the result of moral degradation, and that savage tribes are the isolated offshoots of more civilized nations. Whether this be so or not, the undoubted fact of the *improvability* of the race, from the lowest stage of degradation to the highest pinnacle of excellence, is conclusive evidence, irrespective of any absolute anatomical difference, that man's nature is entirely diverse from that of brutes, and that he must, necessarily, have had a different origin. This fact alone, instead of supporting, would be a sufficient refutation of Mr. Huxley's conclusion.

Some of our readers may think that we have been at unnecessary pains in combating so fully a doctrine which seems so preposterous in itself, and which is supported by an argument so illogical. But this opinion will be changed, when the reader learns, with surprise, that this doctrine, however absurd it may seem to him, has been received with favor by many scientific men, and that it has been endorsed, we may even say, laboriously supported, by Sir Charles Lyell. What, however, has chiefly induced us to spare no pains in exposing the false philosophy of this book, is the fact, that its plausible but deceptious reasoning in regard to scientific facts, is readily received by the unlearned,—for whom it is expressly written,—as a conclusive scientific argument against the truth of Revelation.

It was our intention to establish, directly, the distinct nature and origin of man, by an argument founded on his faculty of speech; on his power of abstract reason, enabling him to ascend from facts to principles; and on his spiritual endowments, which are his true characteristics, and which, notwithstanding Mr. Huxley's assertion, are the only considerations which are truly germane to the great question he has propounded and belittled.

But the utter fallacy of the only argument which he has advanced to prove Man's unity with the brutes, and consequent bestiality of nature, render this task unnecessary. We will conclude this Article, already too long, but which could not have been shorter, in justice to Mr. Huxley and his subject, by quoting the forcible words of the distinguished French anatomist whom we have already cited.

"The facts upon which I insist, permit me to *affirm*, with a conviction founded on personal and attentive study of all at present known, that anatomy gives no ground for the idea, so violently defended now-a-days, of a close relationship between man and ape. One may invoke in vain some ancient skulls, evident monstrosities, found by chance, such as that of Neanderthal; and here and there similar forms may *now* be found; they belong to idiots. One of them was discovered, a few years ago, by Dr. Binder, who, at the request of M. Macé, presented it to me. It is now in the collection of the Museum. It will henceforth be counted among the elements of the great discussion on the nature of man, which now agitates philosophers and troubles consciences; out of which discussion, some day, the divine majesty of man shall arise, consecrated by combat, and ever henceforth be inviolable and triumphant."

(*To be continued.*)

Art. II.—BISHOP HORATIO POTTER'S PASTORAL LETTER, AND ITS ASSAILANTS.

A Pastoral Letter to the Clergy of the Diocese of New York, from the Bishop, May, 1865.

This Pastoral Letter of Bishop Potter came none too soon. It has been manifest for some time, that Ecclesiastical matters were approaching a crisis in New York city and its immediate vicinity, and that an issue of some sort was about to be made; though in what form it would present itself, of course, no body could tell. The only question, now, concerning this Pastoral, is, whether it will answer the end for which its amiable and peace-loving author designed it. We confess to some doubt on this point. Positive treatment, vigorously applied, is sometimes the mildest, most judicious, and only effective method, in dealing with physical diseases; it has seemed to us that there was a degree of virulence manifested in the spiritual distempers of our time, which would be much more likely to feed and grow on gentle remedies, than be subdued by them. We may be mistaken.

The Church in New York city has always been strong enough to be secure against open assaults. Churchmen in New England were persecuted, fined, and imprisoned, simply because they were Churchmen; and the vilest placards were once posted in Boston to stir up the mob in resistance to the landing of a Bishop at that home of "Freedom of Conscience!" Here, in New York, the hatred of the Church has been bitter enough; but it has vented itself in milder and more harmless ways. It has usually been content with snubbing such men as Bishop Wainwright when it could get them into one of its "Fore-fathers" Meetings; or, with publishing and puffing such stupid octavos as Mr. Shimeall's "End of Prelacy." It is, however, a little amusing, that the same sort of men who set Mr. Shimeall to write his ridiculous book,—a book filled with the most scurrilous charges and historical misstatements, and then gave to that book their public written endorsement, and who seemed

J. W. Coit Jan. 8. 1866

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ART. I.—THE ORIGIN AND ANTIQUITY OF MAN: DARWIN, HUXLEY AND LYELL.

PART III.

The Geological Evidences of the Antiquity of Man, with Remarks on Theories of the Origin of Species by Variation; by SIR CHARLES LYELL, F. R. S. Philadelphia: 1863.

HAVING exposed the fanciful scheme of Mr. Darwin, and the illogical argument of Mr. Huxley, in the two preceding Parts of this Essay, we now come to the conclusion of our task, and propose to examine, critically, the views of Sir Charles Lyell, promulgated in his latest work on the "Antiquity of Man."

It is said that Napoleon Bonaparte rebuked the religious infidelity of Marshal Duroc, who had, on a certain occasion, expressed his belief in a very incredible story, by the remark, "there are some men who are capable of believing every thing but the Bible."

The three authors whose works are reviewed in this Essay, furnish an apt illustration of this remark. Mr. Darwin is unable to credit the Scriptures, which declare that all the forms of life were originated by a Divine Creator, and that all the

laws of Nature emanate from a Divine Lawgiver; yet he has no difficulty in believing that all the distinct species of animals are the results of accidental variations of some common non-descript germ; and that the laws which govern their existence have been determined by some imaginary and impossible principle of Natural Selection, which they themselves have fortuitously given birth to, in their struggle for existence. He requires us to disbelieve the authoritative Revelation of the Creator,—the authenticity of which is capable of verification,—and proposes, for our acceptance, the most improbable scheme of Creation which an unbridled imagination can devise, based solely on his own gratuitous assumptions. He rejects, as unreasonable, Moses' account of the successive acts of Creation, which is in perfect harmony with the disclosures of science, and his statement, that the distinct forms of animal life were created separately and independently, which also comports with all known facts: but he can see no difficulty in believing that all the distinct species of animals were produced by accidental transmutation, under the guidance of a physical divinity, itself accidentally developed,—although not a single fact in science can be adduced to prove even the possibility of such an occurrence,—or the probable existence in Nature of such a chimera as he designates under the name of "Natural Selection." Truly, the credulity of scepticism exceeds belief!

Next comes Mr. Huxley, a practical anatomist of distintuished merit, who believes that the suggestive and fanciful vagaries of Mr. Darwin furnish a sound basis for scientific theorizing. He accordingly lays down his scalpel, and takes up the pen, and by an argument founded on the differences of animals, which is not only illogical in itself, but absurd in its application, he endeavors to prove, in contempt of such "time-honored theories" as the Bible propounds, that Man is the lineal descendent of the gorilla.

Lastly, Sir Charles Lyell, who has devoted a long life, with renowned success, to practical and theoretical Geology, is infected with the same credulous scepticism, and renounces, in his old age, the firm convictions of his vigorous prime, which were then in accordance with Revelation. With garrulous

prolixity, he has reproduced his accumulated store of facts, and written a book of 513 pages, to endorse the visionary notions of his friends, Darwin and Huxley, and to prove that man, if not of bestial origin, at least commenced his career as a brutal savage, and dwelt on this earth a hundred thousand years ago, the Bible to the contrary notwithstanding.

We shall deal with Sir Charles in the same manner that we have with his two friends. We will frankly admit, so far as possible, all his facts; but we will subject to rigid scrutiny the inferences which he draws from these facts, and will test, by a rigorous analysis, the soundness of his theoretical speculations.

It is important to state, at the outset, that Sir Charles Lyell's estimates in regard to *time* are to be taken with great allowance. From the commencement of his career as a Geologist, he has always been a strenuous advocate of the theory, that all the changes which this earth has undergone have been brought about *gradually, by the uniform action of the same causes which are now at work, modifying its* PRESENT *surface.* This theory, which is in direct antagonism to the more prevalent one of cataclysmic convulsions, requires, as a necessary element, illimitable periods of time, to account for successive geological formations. Consequently, this claim of epochs of immense duration, in connection with his pet theory of *gradual change*, became, and still is, a special hobby of Sir Charles Lyell. It governs all his geological speculations, and gives a bias to all his inferences.

On the other hand, many other geologists equally entitled to respect, and some who rank higher, such as Elie de Beaumont of France and Sir Roderick Murchison of England, maintain the opposite theory, of sudden changes, produced by paroxysmal convulsions. Lyell has satisfactorily demonstrated the probability, that certain formations have been gradually produced by existing causes, acting during immense periods of time, but he is constantly forced to admit that these causes may have acted with very different degrees of energy at different times. This admission is fatal to any dogmatic assertion in regard to absolute time; for the varying ratio of increase, being unknown, the time necessary for a formation must also

remain unknown, even if we admit its present progress to be gradual and constant.

The advocates of the opposite theory give us equally good reasons for believing, that immense changes have been produced by convulsive agency, causing sudden great disruptions and vast upheavals. Each theory, doubtless, contains a portion of the truth, and error lies in the extreme views of each. All speculations in regard to time, founded on either theory, can never amount to anything more than doubtful guesses, even when the speculator is free from the bias of extreme views. But, in regard to this element of time, Sir Charles Lyell is, and always has been, from the necessities of his theory, an extremist; and as such, he undertakes in this volume to determine the antiquity of man.

After a short Introductory, our author, in Chap. II., opens the consideration of his subject, by detailing the works of art found in Danish peat, in Danish shell-mounds, and in ancient Swiss and Irish lake-dwellings. These Danish deposits of peat occur in hollows, in the northern *drift* formation, which constitutes the most superficial matter of the earth's surface. The basins or depressions in which this peat has been formed, or rather *deposited*, show accumulations of this semi-fluid matter, varying in depth from ten to thirty feet. He states, that around their borders, and at various depths in them, lie trunks of the Scotch fir, (Pinus Sylvestris,) often three feet in diameter, and that "this tree is not now, nor ever has been in historical times, a native of the Danish Island." It appears clear to him, that this tree has been supplanted by the sessile variety of the common oak,—for many prostrate trunks occur in the peat, at higher levels than the pines or firs, and that this last, in its turn, has "been almost superseded in Denmark by the common beech." He admits that other trees, still flourishing in Denmark, occur at *all levels* of the peat, and that the shells, mammals and plants buried in it are all of recent species.

All these facts and statements are consistent with an explanation, which would assign to this peat deposit no very remote antiquity; but our author draws his first inference in

favor of the immense antiquity of a pre-Adamite man, from the fact "that a stone implement was found under a buried Scotch fir, at a great depth in the peat." He asserts that Danish and Swedish antiquaries, by studying such implements, as well as other articles of human workmanship preserved in peat, in sand dunes on the coast, and shell mounds, have succeeded in establishing a chronological succession of periods, which they have called the ages of *stone, bronze* and *iron*, under which they class their antiquarian relics, as illustrative of the early condition of the aboriginal inhabitants. This generalization, or rather assumption of these Northern antiquaries, which is convenient for classifying relics, is immediately adopted by our author, who appropriates it as an established and universal truth, considering it of general application to all other parts of the world, and using it as a basis for other assumptions and generalizations of his own.

The following quotation shows the immediate use to which our author puts this theory, and is a fair sample of the very quiet way with which, in a hundred instances, and on very slight grounds, he puts forward his own opinions, or the assumption of others, as if they were indisputable truths.

"The age of stone, in Denmark, coincided with the period of *first vegetation*, or that of the Scotch fir, and in part at least with the second vegetation, or that of the oak. But a considerable portion of the oak epoch coincided with 'the age of bronze,' for swords and shields of that metal, now in the Museum of Copenhagen, have been taken out of peat in which oaks abound. The age of iron corresponded more nearly with that of the beech tree."—p. 10.

He then proceeds to speculate in regard to the progressive advancement of the primeval savage of the stone period, toward the civilization of the age of iron.

He finds, in the Danish "shell-mounds," evidence of the remote antiquity and original state of the primeval man of the stone period. These mounds, or, as they are called by the Danes, "kitchen refuse heaps," are very similar to the Indian shell heaps, which occur along our coast, from Maine to Florida. They vary in height from three to ten feet, and are composed of oyster and other shells of the neighboring coast, interspersed with flint knives, rude pottery, implements of bone

and wood, and the bones of various animals used for food. None of these animal remains are of extinct species, except the Bos primigenius, which existed in the time of Julius Cæsar. He concludes that the primitive man, who left these "kitchen refuse heaps" behind him as monuments of the stone age of the world, was not a cannibal, because no human bones are found in them ; that he was not an agriculturist, because no grain of any sort is found amongst this offal ; that man in that age lived by fishing and hunting, and had no domestic animals but the dog, because the bones of such animals are not found in these heaps ; and that he was of smaller stature than his successors of the bronze and iron ages, and had a small, round head, like the present Laplander, because a few stray skulls picked up in the vicinity or found in the peat, were of this description, while those of the bronze and iron age of the world, were "of an elongated form and larger size." He admits, however, that "there appear to be very few well authenticated examples of crania referable to the bronze period."

The early explorers of the new world found far stronger evidence to show that just such a primitive stone age existed *contemporaneously* with the advanced civilization of Europe, and that just such a primeval man roamed over the buried memorials of a *preceding and more civilized race.* In the supposed absence of all historic records, the archæologists of a far distant future, would trace back the civilization of the present iron age of the United States, to this Indian stone age, with just as much show of reason as antiquarians now refer the civilization of Europe to a primitive period of rude flint implements, from which it gradually emerged and advanced slowly, through successive ages of bronze and iron.

There is nothing to forbid the belief, that while a few roaming hunters were making their "refuse heaps" on the distant shores of the Northern Ocean, there were populous communities of more enlightened men in those Eastern centers of civilization, which are known to have been the oldest seats of art.

It is more reasonable to believe, that occasional contact with these centers subsequently improved the condition of these stragglers, and added a few metal tools to their stock of flints,

before they were overtaken by the general march of civilization, than to suppose that primeval savages gradually originated language and arts, during these assumed countless ages of progressive advancement, of which there is no evidence save these metal tools. The requisite time claimed for such progress, however small the original number of the autochthones, must necessarily have begotten a teeming population, which would have left, everywhere, numerous memorials of its presence; whereas, a few scattered bones and here and there a skull are all that remain to indicate the existence of myriads. It cannot be asserted, with any show of reason, that time has destroyed all but a very few specimens of this human multitude, and yet spared, in great abundance, the smallest bones of animals which they consumed for food. It is far more in accordance with probability, as well as history, to conclude, from these archæological facts, that contact with civilization had, from time to time, introduced weapons and utensils of metal, than to imagine long successive ages of stone, bronze and iron, in order to account for a few bronze or iron implements, found interspersed with the flint relics of the original sparse settlers.

Nor is there anything, in the occasional superposition or wide range of these scattered relics, to justify a generalization so sweeping, and so beset with insurmountable difficulties. That stragglers, roaming from the centers of civilization and becoming savage, should universally first adopt the rudest means at hand, such as flint and bone, to supply themselves with tools and implements of war, is conceded. That such savage tribes may have, in many instances, originated some steps towards the arts and sciences, and have invented, successively, instruments of bronze and iron, we will also concede. But do these conceded facts, and the relics which attest them, force us to the conclusion that man was, *ab origine*, a savage, just removed above the brutal state,—if not of bestial origin,—and that he has advanced from this brutal state to civilization, through the countless ages of time necessary for such a being to invent, first, *language*, and then arts and sciences? Or was he, at the start, created a more perfect being, endowed with speech, with developed moral and intellectual faculties, and with divinely

implanted germs of knowledge, which readily developed into those arts and sciences which his wants demanded ?

These are the two questions at issue. The latter theory is consistent with all known facts, and with the history of the race. It satisfactorily accounts for the rapid progress of civilization, in certain primitive centers, and for its subsequent lapse,—from adverse causes,—in these same centers, leaving behind monuments to attest its previous existence. It also satisfactorily explains the origin and long continuance of barbarism in those tribes which had become separated from these centers, and accounts for those relics which record their imperfect attempts to recover a lost civilization. This theory is taught and explained by a Book, the authenticity of which, as a Divine revelation, is capable of verification, and the testimony of which, thus verified, is decisive.

The other and opposite theory is maintained by our author, and by those who advocate the fanciful views of Darwin and Huxley. It requires the admission of great improbabilities, not to say impossibilities ; it rests chiefly on opinions, assumptions, and unwarrantable generalizations of isolated facts, and is supported solely by a few obscure relics of a barbarous antiquity, which are much more rationally accounted for by the opposite theory, than by the hypothesis which is proposed as a substitute. It demands, as a necsssary element, an immense antiquity for man, and this demand Sir Charles Lyell attempts to supply from the geological record.

He brings to bear on this point, with tiresome profusion, all the opinions, assumptions and speculaticns of others, as suggestive, approximate or decisive, to which he very quietly adds, without proof or argument, his own opinions, in the way of correction, modification or confirmation. The evidence of the Danish peat and shell mounds, is summed up in the following words :—

"How many generations of each species of tree flourished in succession before the pine was supplanted by the oak, and the oak by the beech, can be but vaguely conjectured; but the minimum of time required for the formation of so much peat, must, according to the estimate of Steenstrup and other good authorities, have amounted to at least 4000 years; and there is nothing in the observed rate of tho

growth of the peat opposed to the conclusion that the number of centuries may not have been four times as great, even though the signs of man's existence have not yet been traced down to the lowest or amorphous stratum. As to the "shell mounds," they correspond in date to the older portion of the peaty record, or to the earliest part of the age of stone as known in Denmark."—p. 17.

In other words, according to Mr. Steenstrup, the flint instrument "taken out with his own hands" from a peat bog, must be at least 4,000 years old; but our author thinks it might have been 16,000 years old, and that other still older signs of man's existence might be traced still farther down in the peat. He quietly assumes that the "shell mounds" are as old as the oldest part of the peat, and belong to the earliest part of the assumed Danish stone age.

In another part of the volume, he assumes a far greater antiquity for an implement found in peat; advancing, in proof, the opinion of a French archæologist, whose ideas in regard to the formation of this substance are not so liberal as Mr. Steenstrup's. To say nothing of the great liability of stone and metal tools to *sink* in the soft muck of a peat bog, there are conclusive reasons for setting aside all the evidence of man's antiquity drawn from peat deposits, upon which our author, in different parts of his book, lays great stress.

So varying are the conditions which modify the rate of growth of peat, and so various are the accidents which attend its accumulation, or deposit in "hollows," that no reliable indication of age can be derived from the quantity or depth of this deposit. Many facts corroborative of this statement, might be produced from the previous works of Sir Charles Lyell, and from other authors. But to show how perfectly unreliable is the above calculation, which is based on the depth at which a flint instrument was found in these Danish "hollows," we need only quote the words of our author used elsewhere:—

"The depth of overlying peat affords no safe criterion for calculating the age of the cabin or village, for I have shown in the 'Principles of Geology' (Ch. XLVI.)* that both in England and Ireland, within historical times, bogs have burst and sent forth great volumes of black mud, which has been known to creep over the country at a slow pace, flowing somewhat at the rate of ordinary lava currents, and

* See Book III, Chap. XIII., first Am. Edition, 1837.

sometimes overwhelming woods and cottages, and leaving a deposit upon them of bog earth fifteen feet thick."

The well known account of the bursting of Solway Moss, in 1772, caused by rains, the like of which had not occurred for 200 years, and by reason of which its peaty matter flowed into the valley of the Esk, overwhelming farms and hamlets, explains how the relics of man may be found in ancient peat deposits, accumulated in "*hollows*," without attributing to these deposits any great previous antiquity.

In regard, also, to the time necessary for the *formation* of peat, there is a remarkable fact on record, which proves the unreliableness of Lyell's estimates of antiquity, drawn from this source. In 1711, George, Earl of Cromartie, at the age of eighty years, published in the Philosophical Transactions of the Royal Society, a very valuable paper on this subject. He states that in 1651, in passing through the parish of Lochbrun, he carefully noticed a wood of very ancient fir trees, standing firm on a little plain of half a mile round, midway on the slope of a very high hill. On visiting this locality fifteen years afterwards, he was surprised to find in the place of this wood, a level surface of moss, with not a vestige of a tree to be seen. Upon inquiry, he was informed that the wood had been prostrated by winds, and that their interlaced trunks, arresting the moisture from the declivity above, had caused the whole to be overgrown by "a green moss or bog," which was unsafe to cross. Doubting the fact, he made the attempt, and immediately sank in the bog up to his arm-pits, before he could be withdrawn. He goes on to state, that in 1699, "the whole piece of ground was turned into a common moss, where the country people were digging turf and peats, and still continue so to do."

Here we see that forty-eight years sufficed for the formation, on firm land, of a peat deposit of such thickness as would denote, according to Lyell's estimate, an antiquity greater than that assigned to Adam. In the absence of this record, had he found, as he doubtless might, some relic of human art in the soil under this deposit, he would, as in other cases, have advanced it as an incontestable proof of a pre-Adamite man.

Our author next proceeds to consider the "Swiss Lake Dwellings," built on piles, near the shores of Lake Geneva and other small neighboring lakes. There is nothing in the presence or construction of these rude dwellings to indicate any very remote antiquity, for Herodotus informs us that the Pæonians built just such lake dwellings, to escape the attacks of Xerxes. But our author finds in some of them "implements of stone, horn and bone, but none of metal," and these he refers to the *stone period* of the world. In others he finds some tools and weapons of bronze, and these he attributes to the "*bronze period*," at which time arts had begun to arise among men. He makes a nice point of the fact, that the huts of the bronze period were situated more westerly, showing the *westward* march of civilization, in this little confined lake district. He states, that "the tools, ornaments and pottery of the bronze period, in Switzerland, bear a close resemblance to those of the corresponding age in Denmark, *attesting the wide spread of a uniform civilization* over central Europe, at that era;"—a very sweeping generalization, based on forty rude metal hatchets, dredged up in Lake Geneva. In some few of these aquatic stations, as well as in other places on land, he finds a mixture of bronze and iron implements, and works of art, "including coins, and metals of bronze and silver, struck at Marseilles, and of Greek manufacture, belonging to the first and pre-Roman division of the age of iron."

He speculates largely in regard to numerous fragments of bones of wild and domestic animals, found in or near the foundations of these dwellings, and he conjectures, as in the case of those found in Danish refuse heaps, that "the greater number, if not all these animals, served for food." They amount to fifty-four species; and he ingeniously distributes them, with the help of Rutimeyer, among these three assumed and remote ages of man; they are all, however, animals *now living* in Europe, except the Bos primigenius, which existed in the time of Cæsar. We notice among those allotted to the bronze period, the ox, sheep, goat, hog, a large *hunting* dog, "and with it a small horse, of which genus very few traces have been detected in the earlier settlements,—a single tooth, for

example, at Wangen, and only one or two bones at two or three other places." He thinks, that in "the earliest age of stone, when the habits of the hunter state predominated over those of the pastoral, venison or the flesh of the stag and roe was more eaten than the flesh of the domestic cattle and sheep." But the great mass of animals constructed out of these *disjecta membra*, were common to all those far distant epochs of man's existence, within the narrow limits of these Swiss lakes, and were precisely the same animals which now inhabit the country. In addition to the common fishes, wild fowl and reptiles, he enumerates all the present wild mammalia, such as "the bear, the badger, the common marten, the polecat, the ermine, the weasel, the otter wolf, fox, wild cat, hedgehog, squirrel, field mouse, &c.," the greater part or all of which he tells us served for food. Not a very inviting bill of fare, certainly. Perhaps, however, these unsavory animals were killed for their *skins ;* the assumption that they were used for food, is entirely gratuitous.

While the bones of the fox occur every where in great abundance, he tells us that only "a single fragment of the bone of a hare has been found at Moosseedorf." He assumes, backed by the authority of Rutimeyer, that this fact proves a universal preference of fox to hare, on the part of the lake-dwellers of the stone period, and "establishes a singular contrast between their tastes and ours." This is a very astonishing deduction from a single fact, and is based, also, on a gratuitous assumption. This solitary fragment of bone might be good evidence that hares were scarce *where* foxes were plenty ; but who, except a *savant*, would ever have dreamed that this solitary bone could be *proof* of a universal preference of fox-meat to hare, and *establish* such a singular contrast of tastes between the gourmands of the Swiss stone period and the British age of iron ? To an unsophisticated mind, such generalizations would seem to manifest more imagination than common sense.

He also informs us, that, "amidst all this profusion of animal remains" which served for food to men belonging to different ages of the world, during three long chronological ages,

only one solitary human skull is found, to represent the three ages of stone, bronze, and iron.

After careful examination of this solitary specimen, Professor His observes, that "it exhibits, instead of the small, rounded form, proper to the Danish peat mosses, a type much more like that now prevailing in Switzerland, which is intermediate between the long-headed and short-headed form." This is, doubtless, a very correct and cautious observation of Prof. His ; and the plain, common-sense conclusion is, that it belonged to the present Swiss race, since it has their prevailing characteristics. But this skull is authoritatively pronounced to be "of the early stone period," simply because it was dredged up in that part of the Lake of Zurich which is assumed to have been the theater of the stone period. Accordingly, the inference which our author draws from this opinion of Prof. His, is the following :—"So far, therefore, as we can draw safe conclusions from a single specimen, there has been no marked change of race in the human population of Switzerland, during the periods above considered."

Here we have another brilliant generalization of an assumption, based moreover on the perversion of a cautious opinion. A solitary skull, which is *assumed* to belong to the early stone age of Switzerland,—though differing from another solitary skull, which was made the type of the same age, "of a uniform civilization," in Denmark,—is pronounced by Prof. His to be similar to those of the *present* Swiss race. Thereupon, our author makes this solitary skull typical, also, of the other two ages, and comes gravely to the conclusion, (with a salvo,) that there has been *no marked change in the human population of Switzerland, during the ages of stone, bronze, and iron!* This, certainly, is generalizing with a vengeance ; we need not the cautionary salvo of the author, to guard us against the fallacy of such unscientific speculations.

On the strength of such assumptions, we are called upon to believe that the present Swiss population have come down, with little change of race, from the primeval savage of the stone period ;—that their rude fox-eating forefathers continued to inhabit a little lake district, until they had there instituted

agriculture and metallurgic arts, during two successive ages of civilization, necessarily embracing a period of time sufficiently long to fill all Switzerland with an overflowing population, and convert it into a populous cemetery of the dead;—that, although numerous animal remains and cereals used for food, are said to manifest the habits and tastes of each age, yet they left behind them only the remnants of a few wooden huts, some metal tools, and a solitary skull, to attest the existence of vast multitudes, their peculiarities of race, and their gradual progress towards civilization, through long successive ages of stone, bronze, and iron!

Assuredly, scientific men who have hobbies to ride, go out of their way to invent grave absurdities. The only rational explanation of the facts, which does not do violence to common sense, is, that a few rude savages had built temporary hunting lodges in the water, for fishing purposes, and probably, also, to protect themselves from abounding wild beasts,—and that the pioneers who preceded the Roman invasion of Helvetia, introduced the few metal utensils, which form the sole foundation for these assumed ages of stone, bronze, and iron.

But our author brings geological evidence to prove the existence of his three chronological ages, in this particular locality, and estimates, upon the authority of M. Morlot, their duration in years. The case which he cites,—though imperfect in its details,—is one of the strongest in the book. We will, therefore, quote it entire, for the purpose of cross-examining the evidence which is adduced in support of its conclusions.

He says:—

"The attempts of the Swiss geologists and archæologists to estimate definitely in years the antiquity of the bronze and stone periods, although as yet confessedly imperfect, deserve notice, and appear to me to be full of promise. The most elaborate calculation is that made by M. Morlot, respecting the delta of the Tinière, a torrent which flows into the Lake of Geneva, near Villeneuve. This small delta, to which the stream is annually making additions, is composed of gravel and sand. Its shape is that of a flattened cone, and its internal structure has of late been laid open to view, in a railway cutting one thousand feet long and thirty-two feet deep. The regularity of its structure throughout implies that it has been formed very gradually, and

by the uniform action of the same causes. Three layers of vegetable soil, each of which must at one time have formed the surface of the cone, have been cut through at different depths. The first of these was traced over a surface of 15,000 square feet, having an average thickness of five inches, and being about four feet below the present surface of the cone. This upper layer belonged to the Roman period, and contained Roman tiles and a coin. The second layer followed over a surface of 25,000 square feet, was six inches thick, and lay at a depth of ten feet. In it were found fragments of pottery unvarnished, and a pair of tweezers in bronze, indicating the bronze epoch. The third layer, followed for 35,000 square feet, was six or seven inches thick, and nineteen feet deep. In it were fragments of rude pottery, pieces of charcoal, broken bones, and a human skeleton having a small, round and very thick skull. M. Morlot, assuming the Roman period to represent an antiquity of from sixteen to eighteen centuries, assigns to the bronze age a date of between 3,000 and 4,000 years, and to the oldest layer, that of the stone period, an age of from 5,000 to 7,000 years."—p. 28.

We have examined the Memoir of M. Morlot, and find the "elaborate calculation," referred to above, to be merely an approximative conjecture, based on the growth of the cone in proportion to the volume of its alluvium, and varying from 5,000 to 11,000 years. The above figures are, therefore, to be considered as guesses. We also find that M. Morlot, after diligent search in the bed of the so-called stone period, "has not had the good fortune to discover in it any stone hatchet or other antiquity of that sort." The animal bones found in this bed belong to "the ox, goat, sheep, pig and dog, all domestic," and such as are assigned to the bronze and iron age. The skull, also, found in this lowest bed, "was very round and small, and remarkably thick, showing a strongly-marked Mongolian type," an entirely different type from that assigned by Lyell to the Swiss stone period.

According to M. Morlot, the torrent of the Tinière, where it flows into the Lake of Geneva, like other Alpine torrents issuing from ravines or small lateral valleys, forms a rounded, "*fan-like*" deposit or flattened cone at its mouth. This cone has an inclination of four degrees, corresponding to the bed of the torrent; its radius is 900 Swiss feet, and its transverse diameter is 1,000 feet at its central part, where the railway cuts through it at right angles, or perpendicularly to its axis. The greatest height of this conical mound is at the central

part of the railway section, and is just 32½ feet above the level of the rails. So far as the size of this cone is concerned, the whole quantity of matter comprising it might have been deposited during a single season, by such extraordinary inundations as have been known to occur in that district in modern times. One which occurred so late as 1818, to which we will presently refer, deposited in a similar position a vastly greater amount of transported matter. But Lyell, in accordance with a theory which he has made a pet hobby, assumes "that it has been formed *very gradually*, and by the *uniform* action of the same causes." Let us see what evidence there is to support this assumption. We are informed that this deposit is composed of four gravel beds, separated by three intervening layers of soil. Taking the dimensions of these beds as stated, but reversing their order, the first or lowest deposit of gravel and sand brought down by the torrent, was thirteen feet thick, and on the top of this was found his primitive man of the so-called stone period. The next bed was nine feet thick, and this underlaid his assumed bronze period. The third bed was six feet thick, which reached up to his Roman iron period ; while the last deposited bed of four feet, forms the present top of the cone. Now, whatever length of time may have elapsed between the deposition of the first and last of these beds, it is very certain that they could not all have been continuously deposited by the very gradual and uniform action of the river, as asserted. It is evident that this action must have been completely suspended, during three intervals of indefinite duration, in order to permit the formation of three successive layers of vegetable soil ; otherwise the whole mass would have been a homogeneous deposit of sand and gravel, undivided by these intervening layers. The facts of the case, therefore, forbid the assumption that this mass was formed gradually, by the continuous and uniform action of the river, but justify us in concluding that it was produced at intervals, and by extraordinary freshets. Again, on what authority does he make this isolated sand cone, washed down by a mountain torrent, and superimposed on the alluvial drift, which forms the very outer vestment of the earth, the theater of successive chronological ages of immense

duration? We admit that the Roman coin is proof that men existed at the time of, or subsequent to, the Roman invasion. But the only evidence that he has of the existence of a preceding bronze age, is a solitary *bronze tweezers!* Now this bronze instrument was in very common use at Rome, by men as well as women, and is just as good proof of a Roman iron age, as a copper or silver coin is. The only evidence he has of a primitive stone period, is a human skeleton, with a small, round and very thick skull. This round skull, by the bye, is quite different from the elongated one which was dredged out of this same Lake of Geneva, and which was made, as we have seen, the type of the lake dwellers of the stone period.

A thick, round skull, and a solitary bronze tweezers, found in a hillock of sandy gravel, washed down by a mountain torrent, are the only evidences to support our author's foregone conclusion of successive ages of stone and bronze. It is true, he speaks of "fragments of rude pottery," but broken pieces of pottery, however rude, without specific notes and marks, are valueless as determining the question of age. Pottery is the most universal as well as the earliest of the arts, and fragments of unglazed earthen ware, and the rudest pottery, may be found among civilized nations of modern date. Rudeness alone is no test of age. We doubt not that the coarse pottery used by Roman soldiers, after being smashed to fragments, and lying in the ground for 1800 years, would look rude enough to the eye of an archæologist, to be assigned to the so-called stone period.

Upon what data does M. Morlot base his conjecture, that this assumed stone period is from 5,000 to 7,000 years old? We are informed that it rests on the assumption that the Roman period, indicated by the coin found four feet below the top of the cone, represents an antiquity of from sixteen to eighteen centuries. If so, the question is easily solved by the rule of three. If it takes 1,800 years to make 4 feet of deposit, how long would it take to make a deposit of 32 feet? But this calculation would give far greater antiquity than is claimed. Besides, it presupposes that the whole cone has been deposited continuously and uniformly, which assumption is proved to be

untenable, by the existence of intervening layers of soil. Nor is the calculation, founded on the thickness of these layers of soil and the probable time necessary for their formation, a whit more reliable. Facts prove that, in some cases, thousands of years are necessary to produce a thin covering of soil, while in others, a few hundred years are sufficient for the production of thick layers; and then again, in other cases, such layers have been formed, as it were, immediately. The sudden covering up of a rank vegetation by earthy matter, the overwhelming and subsequent decay of a forest, the soil and vegetable matter transported by an inundation, and then deposited, are all capable of producing immediately just such "layers of vegetable soil" as occur between the gravel beds deposited by the River Tinière. Herculaneum furnishes evidence which is decisive on this point. The date of its destruction is well known; and in regard to it, Sir William Hamilton remarks:—"The matter which covers the ancient town of Herculaneum, is not the produce of one eruption only; for there are evident marks that the matter of six eruptions has taken its course over that which lies immediately above the town, and was the cause of its destruction. These strata are either of lava or burnt matter, with *veins of good soil betwixt them.*"*

A geological observer, who is not wedded to this *ultra* theory of very gradual formation which ignores all catastrophes, and who is not committed to the hypothesis of a universal and inevitable succession of stone, bronze, and iron ages, finds no necessity for imagining periods of immense duration, in order to account for the formation of this deposit of gravel, from the effect of causes still operating in this same district. In 1818, the River Dranse, a mountain torrent similar to the Tinière, and which empties into the Rhone through the broad valley of Bagnes, became, in consequence of a succession of very cold winters, dammed up in its mountain gorges, with ice so thick as to resist the usual melting of the summer heat. A lake was thus formed near its source, containing 800 millions of cubic feet of water, held back by a dam of ice, which was liable to

* "Philosophical Transactions," Vol. LXI. p. 7.

give way at any moment, and overwhelm the cultivated plains below. To avert the impending calamity, M. Venetz was employed to tunnel the icy barrier. By means of an artificial gallery, a large portion of the water was gradually drawn off; but at length the dam gave way, and the lake was suddenly emptied of the remainder of the water. The mighty flood precipitated itself through a succession of gorges and basins, stripping the mountain sides of soil and forests, and lower down carrying off houses, barns and whole farms, with cattle and men; rising to the height of ninety feet above the bed of the Dranse, and threatening with instant destruction the inclined plane on which the large village of Le Chable is situated. The huge tide gathering fresh spoils at every step, and resembling a "moving chaos" of rock and mud, more than water, "continued its work of destruction till its fury became weakened by expanding itself over the great plain formed by the valley of the Rhone," and in six and a half hours it discharged itself into the Lake of Geneva. The engineer, M. Escher, in his Memoir of this event, informs us that a stratum of alluvial matter, *several feet in thickness, was deposited over the whole of the lower part of the broad valley of Bagnes.* Several other instances are on record, to prove that precisely the same cause has repeatedly produced similar results, in this same region. This cause furnishes a sufficient explanation of the fact that successive deposits at the mouth of the Tinière have been, at different intervals and in separate beds, piled up to the height of 32½ feet above the lake, which never could have been accomplished by the ordinary, gradual and uniform deposition of the river, as Sir Charles Lyell contends. It is perfectly legitimate to conclude, that the same cause which has repeatedly produced extraordinary inundations in this district, attended with such remarkable results, as in the case of the Dranse, has also at other times similarly affected the Tinière, the conditions of both rivers being similar. We may infer that at different intervals, this latter mountain torrent has, also, from the same cause, in a less degree, and on a more circumscribed area, transported and deposited at its mouth, extraordinary quantities of alluvial matter; that the heavier parti-

cles of gravel and sand have settled below, while the lighter earth and drift wood have formed over them the "layers of vegetable soil;" that successive beds have thus been added, by successive inundations; and that the whole mass has, in the course of time, been rounded by the elements into its present cone-like shape.

Nor is there any thing in the character of the relics contained in this mound, to forbid the conclusion that the whole deposit has been formed subsequent to the earliest Roman period. The first inundation buried the wild native, found in the lowest bed, while the subsequent ones swept up from some neighboring surface the bronze tweezer and the coin, both of which are equally good attestations of the Roman invader.

We have dwelt at some length on this Tinière deposit, because it seems one of the strongest cases in the book, and because it is a very fair sample of the manner by which, in every chapter, assumptions and opinions are made to take the place of evidence and reason, in order to establish foregone conclusions.

Chapter III. treats, under separate heads, of "fossil human remains, and works of art," found in the Nile mud, in ancient mounds of the valley of the Ohio, and in the Delta of the Mississippi; of recent deposits of seas and lakes, and of the upheaval of Scotland, and other districts. Under each of these heads, Lyell gives numerous opinions and assumptions, to establish the immense antiquity of man.

Under the first head, he inculcates the peculiarly ultra views and very unreliable opinions of Mr. Leonard Horner. This gentleman induced the Royal Society to contribute funds toward some experiments he was desirous of making in the Nile valley. He intrusted the work to an Armenian engineer, Hekekyan Bey, who employed some sixty Arabs to dig shafts sixteen to twenty-four feet deep, and to bore Artesian holes sixty to seventy feet deep. In the first case, some "jars, vases, pots, and a small human figure in burnt clay, a copper knife, and other entire articles were dug up." From the borings, "pieces of burnt brick and pottery were extracted almost every where, and from all depths, even where they sank sixty feet below the

surface, toward the central parts of the valley." "Another fragment of red brick was found by Linant Bey, in a boring seventy-two feet deep."

These are the facts; now for the conclusions. M. Girard "*supposed*" the average rate of the increase of Nile mud to be five English inches in a century. Our author allows an extra inch, and says, "were we to *assume* six inches in a century, the burnt brick met with at a depth of sixty feet, would be 12,000 years old."

In regard to the other fragment of red brick, he remarks:— "M. Rosine, in the great French work on Egypt, has estimated the mean rate of deposit of sediment in the delta at two inches, and three lines in a century; were we to take two and a half inches, (our author is not so generous in this case,) a work of art seventy-two feet deep *must* have been buried more than 30,000 years ago." To this conclusion, presented as an inevitable *necessity*, we would simply add the proviso, *unless* it had been buried at some time subsequently. The great probability of such a contingency is in fact admitted by the author, for he says, if the boring of Linant Bey was made where an arm of the river had been silted up, "the brick in question might be, comparatively, very modern." Here we have the key to the position of these fragments, and the solution of the whole difficulty. This silting up and shifting of the arms of the river, explain all the discoveries of these Arabian borers, even admitting them to be reliable, as our author maintains, though he frankly acknowledges that some raise the objection, "that the Arabs can always find whatever their employers desire to obtain." But another, and much more serious objection is found in the fact, that burnt bricks were not used in Egypt till the time of the Romans. This Lyell combats, as an erroneous opinion; but how does he do it? He tells us that Mr. S. Birch assures him that it is erroneous, because "he has under his charge, in the British Museum, first a small rectangular baked brick, which came from a Theban tomb," supposed, by the style of art and inscription, to be as old as about 1450 B. C.;—"secondly, an arched brick," with a partially effaced inscription, ending with the words, "of the temple of

Amen Ra," which "is referred, conjecturally, by Mr. Birch, to the 19th dynasty, or 1300 B. C." We are not informed that this brick was baked, unless we are to infer from the term "arched," that it formed part of the arch of a brick-kiln.

This is all that Lyell advances, to disprove the well-known fact, that the common use of burnt bricks was introduced by the Romans, and to support his assumption that fragments of burnt brick must be considered as old as the conjectural age of the mud in which they have been buried. What sort of argument or evidence is this? Because two, or, strictly speaking, only one rectangular piece of *baked* clay, inscribed as a memorial, and *supposed* to be as old as 1450 B. C., is found amid ruins, where a thousand examples attest the universal prevalence of *unbaked* bricks, therefore we must conclude that red burnt brick, precisely like that introduced by the Romans, "extracted almost everywhere and from all depths" in the mud, is 30,000 years old, if Linant Bey happens, as alleged, to bring up a fragment from a boring seventy-two feet deep. With such kind of reasoning, founded on exceptional cases and accidental contingencies, and built up with the various conjectures and assumptions of others, one might prove or disprove anything in the world.

It is remarkable, that Sir Charles Lyell, after enumerating the jars, vases, pots, copper knife, &c., which were found entire in the shafts dug by these Arabians, makes no further mention of them. They certainly would furnish far more reliable evidence in regard to age, than the pulverized detritus brought up by the boring auger; yet he says nothing about them. Some of our readers will recollect the animated discussions which took place, two or three years ago, in the Athenæum, Times, London Record, and other English papers, and which were republished in this country, in regard to the spurious flint hatchets and human fossil found at Abberville, in France. Dr. Falconer and Mr. Prestwich were foremost, among others, in exposing this cruel hoax, to the great annoyance and discomfiture of Lyell, who was committed to it. A fact then transpired, which may serve to account for his silence in regard to the above articles.

It seems that Sir Charles, who was a convert to Mr. Horner's views, was induced to believe, from the depth at which the above pottery was found, that it must have been buried some 15,000 years ago. But before he had fully committed himself, by adding this new *proof* of a pre-Adamite man to the present volume, then in readiness for the press, he was informed by Sir Gardiner Wilkinson, that the marks of the Greek honeysuckle, discovered on some of the fragments, *clearly indicated an age not exceeding* 200 *years prior to the Christian era.*

The discovery of this Grecian pottery has established, conclusively, two very important points,—first, the worthlessness of this testimony of the Nile mud, in regard to the antiquity of man, and secondly, the unsoundness, or at least the unreliableness of Lyell's pet theory, when applied to any question of absolute chronology.

The evidence of the Nile mud would seem, at first sight, to be conclusive, in establishing the pre-Adamite antiquity of man. The case is remarkably free from those suppositions and assumptions, which almost universally characterize speculations on this subject. An ancient piece of pottery is admitted to have been found at a certain depth in the Nile mud. The present rate of increase of this deposit, from existing causes, being ascertained or granted, the only thing assumed is, the correctness of Lyell's theory of gradual and *uniform* deposition; the depth, therefore, of the superincumbent mud being measured, the age of the pottery was determined by a simple sum in arithmetic, and fixed at 15,000 years. Already, timid Christians began to fear for the fate of the Bible; but needlessly. Sir Gardiner Wilkinson turns over the piece, and discerns marks which determine its age as certainly as if it had been recorded in figures, and which prove that this pottery is not over 2,000 years old. What now becomes of the evidence that man is 30,000 years old, drawn from (Roman) red burnt brick, found at every depth in the Nile mud, and which Lyell attempts to prove to be *not* Roman brick, solely from the fact that Mr. Birch has a small rectangular piece of baked clay, *supposed*, by the style of art and inscription, to be as old as about 1450 B. C.? It becomes mere *chaff*, without a single kernel of wheat.

There could not possibly be any more favorable formation for applying this theory of Lyell's. This pottery was not found, like most of his other relics, in drift or transported matter, bearing indisputable marks of disturbance; but it was taken from the homogeneous and uniform *composition* of a river deposit. Yet its testimony, interpreted by this theory, does not even approximate to the truth. The error lies in assuming that the *rate*, as well as the composition of this deposit, has always been uniform; or to express Lyell's theory in his own words, "that it has been formed very gradually, and by the *uniform* action of the same causes" now existing.

Now Lyell must admit, either that his theory is unsound in principle, or that it is unreliable in its application to *absolute chronology*, in consequence of unknown contingencies, or because the mean ratio of increase of a deposit, involving thousands of years, can never be obtained by the most diligent observation of existing causes during a life-time. He is constantly forced to admit, that existing causes may have acted with different degrees of energy at different times, and this implies such a modified presentation of his theory, as renders it inapplicable to the question of the absolute time required for a given formation. Admitting that the formation has been gradual, and due to the constant action of existing causes, yet the varying intensity of these causes during past ages, to say nothing of disturbing accidents, must always remain an unknown quantity. We might just as well attempt to determine the quantity of rain that has fallen during the previous century, by observations confined to a single day, as to try to estimate the deposit of a shifting river during thousands of years, by the most accurate observations of a life-time.

There is nothing stated in regard to the antiquity of the Ohio Mounds, which require notice; but the remarks made in connection with the Mounds of Brazil, respecting "certain human bones imbedded in a solid rock," demand a passing comment.

Lyell tells us, that he first imagined the deposit containing them to be of submarine origin; but that he has long ceased to entertain that opinion. Then, after reading Dr. Meigs'

Memoir, he "at first concluded that the whole deposit had been formed beneath the waters of the sea, or at least that it had been submerged after its origin, and again upheaved." But, on reading Dr. Meigs a second time, he has now no doubt that the deposit containing these bones, "may have been bound together into a solid stone, by the infiltration of the carbonate of lime." Here he confesses to the formation of several distinct hypotheses, involving supposed submerges and upheavals, to account for a simple, and by no means uncommon instance of petrifaction. We cannot help suspecting, that he was finally directed to the last solution, by the fact that the boasted pre-Adamite *stone* man, of Guadaloupe, turned out to be a comparatively modern petrified Indian. Such confessions are instructive, to show what little reliance is to be placed in the hypotheses of scientific men, whose proper business is always to observe and record facts, rarely to generalize, and never to speculate.

His remarks respecting the delta of the Mississippi, are exceedingly brief, but quite startling. From the depth of its deposits of several hundred feet, the immense extent of its area, the annual discharge of the river, and the mean annual amount of solid matter contained in its waters, he conjectures that the antiquity of the existing delta to be, "probably, more than 100,000 years." He states that a Dr. Dowler, whose opinion he quotes from Nott, who received it from somebody else, has calculated the antiquity of a human skeleton "of the Red Indian race," which was found sixteen feet below the surface of this deposit of several hundred feet, to be just 50,000 years old! Our brief reply is, be the age of the delta what it may, Dr. Dowler's calculation of the age of a red Indian's skeleton, found sixteen feet below its surface, is too wild for serious consideration. If the Dr. looks sharply about him, he will find relics of the present white race, buried still deeper beneath the swashed deposits of the Mississippi.

The next subject considered is, some fossil human remains, found by Count Pourtalis, "in a *calcareous conglomerate*," forming part of the Florida coral reef, "supposed, by Agassiz, in accordance with his mode of estimating the rate of growth of those reefs, to be about 10,000 years old." The inference

suggested is, that the said bones are 10,000 years old; but the truth is, they were imbedded in this calcareous conglomerate, and fossilized, in the same manner and by the same causes which operated to produce the stone man of Gaudaloupe, as well as the fossil remains of Santos, and are, probably, of more recent origin.

The remainder of this chapter is occupied in speculations regarding the assumed upheaval of the post-tertiary strata of part of Scotland, Cornwall, Sweden and Norway. It contains nothing that has any direct bearing on the question of man's age, though it indirectly suggests and insinuates his great antiquity. It furnishes, however, a very valuable argument to show the unsoundness of inferences which are frequently drawn in the subsequent part of the book, and exhibits, forcibly, what slender foundations our author requires for his generalizations and speculations in regard to time.

The fact that the sea has retired from the East and West coasts of Scotland, leaving bare a deposit of estuarine silt, on the margin of the present estuaries of the Forth and Clyde, is accounted for by a supposed upheaval of twenty-five feet, in the central district of the country, though it may have been due to another cause. According to Lyell, this upheaval was gradual and insensible, though he admits it may have been intermittent; and yielding to the force of Mr. Geikie's reasoning, he also concedes that the greater part, if not the whole of the elevation, has occurred since the Roman wall of Antoninus was built across this district. Buried in the silted sand and clay of the old coast line, there have been found, during the last eighty years, seventeen boats or canoes, an iron anchor, and other implements of iron, several skeletons of whales, with some pointed instruments of deer's horn. All the boats were found along the margin of the Clyde at Glasgow, five of them under the streets of the city, and twelve, a hundred yards back from the river. "In one of the canoes, a beautifully polished celt or axe of green stone was found; in the bottom of another, a plug of *cork*."* Most of these boats were canoes, hewed out of a single log, with different degrees of skill, but

*This cork could only have been brought from Spain, or other countries occupied by the Romans.

two of them were built with planks, one of which, having the beak of an antique galley, and a stern like those of our own day, was "very elaborately constructed," having the planks fastened to ribs, with oaken pins, and "nails of some kind of metal."

These are the facts, and our author immediately applies them to the corroboration of his inevitable hypothesis of successive chronological ages. He speculates thus:—"Nearly all these ancient boats were formed out of a single oak stem hollowed out by blunt tools, probably stone axes, aided by the action of fire; a few were cut beautifully smooth, evidently with metallic tools." And he then jumps to the conclusion that "There can be no doubt that some of these buried vessels are of far more ancient date than others. Those most roughly hewn may be relics of the stone period; those more smoothly cut, of the bronze age; and the regularly built boat of Bankton may perhaps come within the age of iron." To meet the objection that all of them were found in the same deposit, huddled together within a very circumscribed area, he tells us that this "fact by no means implies that they belong to the same era," because in such deposits "there are changes continually in progress, brought about by the deposition, removal, and redeposition of gravel, &c." He enforces this point by a long quotation from M. Geikie, going to prove that in transported and shifted deposits, *juxtaposition is no proof of contemporaneous age*, but that the most ancient relics may be found in contact with others of comparatively recent origin. We accept this statement as entirely correct; and the value of it will be seen when we come to consider the inferences which our author draws from human relics found in juxtaposition with the bones of extinct animals.

To a practical observer, having no hobbies to ride, the above difference in these boats, instead of proving successive ages and races of men, would simply indicate difference of skill on the part of the rude inhabitants, during that era which immediately preceded and succeeded the Roman occupation of their country. Precisely similar differences may this day be seen on hundreds of bayous, creeks, and small rivers, on our southern coast, or on the far western tributaries of the Mississippi and Missouri. We may now see, side by side, the rude "*dug-out*"

of the negro, with its stone anchor tied with a hickory withe; the better hewed canoe of the white man; and the skiff of the Indian; the plank scow of the plantation, with its big brass padlock (proof of a bronze age); and occasionally a regularly built row boat, with its iron anchor. If any one of the numerous streams, whose whole marine is of this description, should be silted up, as they frequently are by change of channel during excessive freshets, or by other causes which are continually working changes, and after seventeen centuries should be reöpened, some future Lyell would find proof infinitely stronger than any which this book contains, of three successive ages of stone, bronze, and iron. Should he have the same powers of *generalization* as our author, he might, like him, point to a solitary "small, round, and very thick skull" of the negro, then to the more "elongated form and larger size" of that of the Indian, and lastly to a solitary cranium of a buried white man, in proof that three distinct races of men successively dwelt on the banks of this little river, and during countless ages advanced progressively from barbarism to civilization. This is precisely what the present Lyell aims to prove by evidence far less strong than the above data would give him.

As a believer in Revelation, we plead no religious scruples in opposition to Lyell's doctrine. But as a believer in the truth of Science, we are decidedly opposed to receiving it upon such evidence as he offers. Science deals with *facts*, not fancies. Only let him *prove* the truth of his hypothesis in regard to man's beginning on this earth, and we will adopt it; in the mean time, we hold it reasonable to *suppose* that no one but the Creator can reveal the secret of man's original state and the time of his creation.

We have not yet quite finished with this third chapter. The author, following his usual practice throughout the book, seeks, at the conclusion of the chapter, to establish from the geological record some fixed data in regard to man's existence. By *supposing* and *assuming*, he makes some shells on a hill, 600 feet high, on the coast of Norway, to be just 24,000 years old, but he cannot find there any human relic. The upheaval of the deposit in Scotland, in which the boats were found, he admits "may have been subsequent to the Roman occupation."

"But," he adds, "the twenty-five feet rise is only the last stage of a long antecedent process of elevation;" for, as he goes on to tell us, "Mr. Smith of Jordenhill informs [him] that a rude ornament, made of cannel coal," has been found on the coast *fifty* feet above the water, among some gravel containing *marine shells*, which prove that this land was once covered by the sea.

On the strength solely of this information from Mr. Smith, he proceeds to establish the age of this marine sand hill, for the purpose of deducing from it the age of this ornament, which he assumes to be an ancient relic. He says:

"If we suppose the upward movement to have been uniform in central Scotland before and after the Roman age, and assume that as twenty-five feet indicate seventeen centuries, so fifty feet imply a lapse of twice that number, or 3400 years, we should then carry back the date of the ornament in question to fifteen centuries before our era, or to the days of Pharaoh and the period usually assigned to the exodus of the Israelites from Egypt."—p. 55.

We cite the above as a fair specimen of the kind of evidence and style of argument adopted throughout this book to prove the antiquity of man. The only *fact* in this case, is, that a piece of cannel coal, a mineral of not very ancient discovery,* fashioned into a ring or some other rude ornament, such as boys, in a cannel coal district, delight to whittle out of that material, was found on the surface of a marine sand hill 50 feet high. What legitimate connection is there between the date of this work of art, and the supposed age of the hill on which it was dropped? It presents in itself no marks of antiquity except its rudeness, and had it been whittled out and lost by some truant school-boy, which is the most reasonable supposition, a very few seasons would have sufficed to cover it with the loose gravel and sand in which it was found. Yet the date of this cannel coal ornament is carried back by *suppositions* and *assumptions* to the days of Pharaoh, and offered as an argument to prove the immense antiquity of man! The inference suggested very palpably, though not stated, is, that the Scots had begun to mine coal, and had made some progress in the æsthetic arts at "the period usually assigned to the exodus of the Israelites from Egypt."

* A bituminous substance called *ampelion*, from its use by the Greeks and Romans to anoint *vines*, is supposed by some to have been a species of cannel coal.

We are justified in concluding, from this case, that if some other Mr. Smith of Norway had informed our Author that a similar ornament had been found on the surface of the first mentioned marine sand hill of 600 feet high, he would have considered this information proof of the existence of a pre-Adamite 24,000 years ago, who had already advanced beyond the brutal state of the stone age, and also as furnishing evidence that the statements of Revelation in regard to the time of creation and original state of man are false.

Surely Napoleon uttered a profound truth when he said, "There are some men capable of believing every thing but the Bible."

Our limits will not permit us at present to continue the examination of this book; the part which we have already examined, is, we think, the strongest, and we have seen on what a slender foundation of facts the Author relies to support his assumptions in regard to the antiquity of man and his primeval state of brutal savagism. So far as we have advanced in it, we find nothing to excite, in the most timid mind, a reasonable doubt of the usual acceptation of the chronology of the Bible taken in its narrowest sense, although we consider such an acceptance of it open to reasonable doubt.

The book seems to be written with candor and frankness, for, in the prolixity of its details, it does not omit facts and opinions very damaging to the views entertained, and which would almost furnish, to an observant reader, the means requisite for their refutation. Yet the author writes under such an evident bias, and avails himself so readily of the most trivial facts to make out a case, that he is obnoxious to the severest criticism consistent with strict justice, and ought not to complain of a rigid and jealous scrutiny of his opinions.

Time and opportunity serving, we propose, on a future occasion, to pursue the analysis of this book to the end; then to turn the tables on these scientific skeptics, and show that the Bible, considered from a philosophical stand-point, is far more consonant with human reason than these "oppositions of science falsely so called," and vastly more entitled to belief than the fanciful hypotheses which have been offered as substitutes. "And this will we do, if God permit."

Art. II.—GENESIS OF SLANG AND STREET-SWEARING.

(1.) *Dictionary of Slang.* John Camden Holten. London: 1863.

(2.) *Life and Writings of Major Jack Downing of Downingsvill.* Boston: 1834.

(3.) *Clockmaker; or the Sayings and Doings of Samuel Slick, of Slickville.* London: 1840.

Cant words, slang and profane swearing may be set down as three of those 'inventions'* which the Scripture says we have 'found out,' in place of our original 'uprightness.' They are devices of close kindred; resulting either from defects of understanding or of speech. To improve an argument, we invent a term or twist a word; and to enforce it, we add an oath. The practices have, therefore, a common origin; and where not owing to a defective vocabulary, must be held as evidences of an imperfect or depraved intellect. Of these tricks, that of profane swearing is but too common among us; and although the habit may have been somewhat curtailed in our day and within our recollection, still there is room for question, whether it really has suffered any other change than that of patronage; and, whereas in former times it had been chiefly confined to men full-grown and in active life, it is now to be found more frequently among the idlers and the young;—an unsavory indication that the religious discipline and education of our fathers was better than our own. That such is the case, may, we think, be inferred from a comparison of the habits of our ancestors, as recorded and transmitted to us, with what we are accustomed to see and hear every day now. In former times, it required a beard and a sword, to excuse, or give occasion for an oath; but in our day, they greet us from lads in their sports, as well as in their quarrels, and a meer-

* Eccl. vii. 29.